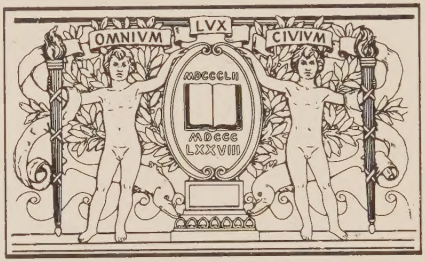

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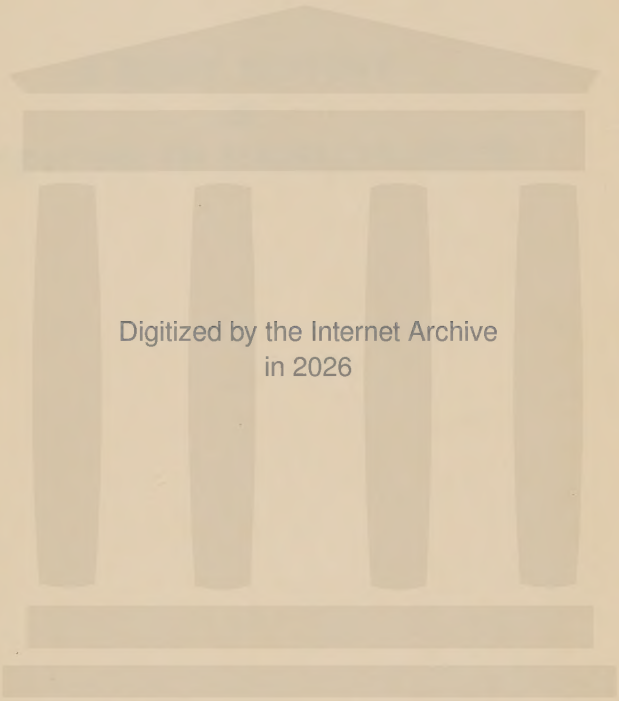

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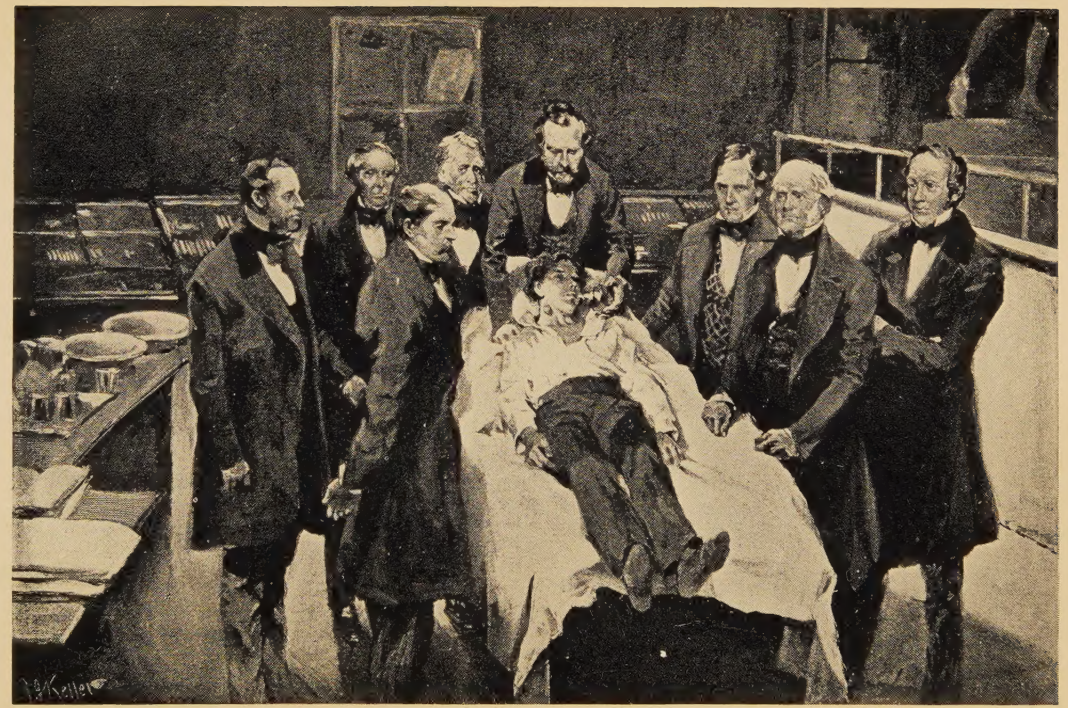
A BRIEF HISTORY OF MEDICINE IN MASSACHUSETTS



THE FIRST PUBLIC DEMONSTRATION OF SURGICAL ANÆSTHESIA

Left to right: Dr. H. J. Bigelow, Dr. A. A. Gould, Dr. J. Mason Warren, Dr. J. C. Warren
Dr. W. T. G. Morton, Dr. Samuel Parkman, Dr. S. D. Townsend, Dr. George Hayward

A BRIEF HISTORY OF MEDICINE IN MASSACHUSETTS

BY
HENRY R. VIETS, M.D.
FELLOW OF THE MASSACHUSETTS MEDICAL SOCIETY

With Illustrations

[redacted]

BOSTON AND NEW YORK
HOUGHTON MIFFLIN COMPANY
The Riverside Press Cambridge
1930

Dr. Henry R. Viets
Nov. 27, 1937

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The Riverside Press
CAMBRIDGE • MASSACHUSETTS
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TO

THE FELLOWS OF

THE MASSACHUSETTS MEDICAL SOCIETY

'Unlike the history of literature or of politics, the history of medicine must be largely an account of men and the lives they led.' — J. G. MUMFORD

* * * * *

'If it be certain, as Galen says —
And sage Hippocrates holds as much —
That those afflicted by doubts and dismays
Are mightily helped by a dead man's touch,
Then be good to us, stars above!
Then be good to us, herbs below!
We are afflicted by what we can prove;
We are distracted by what we know —
So — ah, so!
Down from your heaven or up from your mould,
Send us the hearts of our fathers of old.'

RUDYARD KIPLING

PREFACE

To WRITE an adequate history of the development of medicine in Massachusetts, covering the period from 1630 to 1930, would require an almost unlimited amount of time to devote to the reading of all the contemporary documents. A series of volumes could easily be produced and such, perhaps, will be the work of a future historian; for the present purpose, a brief compilation of the important events in the lives of Massachusetts physicians is considered sufficient.

This book forms a substantial contribution, by the Massachusetts Medical Society, to the Tercentenary Celebration of the settling of the Massachusetts Bay Colony (1930) and, incidentally, to the One Hundred and Fiftieth Anniversary of the founding of the Massachusetts Medical Society (1931).

The author is indebted to many physicians, both living and dead, for help in writing the volume. His predecessor in the field, Samuel H. Green, wrote an admirable treatise on the same subject in 1881 and much of the material found in the early chapters of this book is taken from his publication. For early records, also, the files of the Massachusetts Historical Society publications and the unpublished material in the Boston Medical Library have been invaluable. Without the help of the 'Dictionary of American Medical Biography,' by Howard A. Kelly and Walter L. Burrage, the final chapter could not have been written.

While the author was writing 'A Brief History of Medicine in Massachusetts,' he was always conscious of the influence exerted on his historical development by his teachers and colleagues, especially the late Sir William Osler and, happily still engaged in stimulating interest in medical history, Harvey Cushing, William H. Welch, Edward C. Streeter, Henry Barton Jacobs, Walter L. Burrage and John F. Fulton. The last, a contemporary, has been a constant stimulus by his example of devotion to the subject. Frederic A. Washburn has, also, given helpful criticism and encouragement.

To the officers of the Massachusetts Medical Society the author extends his thanks for allowing him the privilege of publication under their auspices.

HENRY R. VIETS

BOSTON, *September*, 1930

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A BRIEF HISTORY OF MEDICINE IN MASSACHUSETTS

CHAPTER I

INTRODUCTORY

THE development of medicine in Massachusetts in the seventeenth century was a curious mixture of independent thought and the propagation of established tradition. No physician of eminence came to this country and medicine was transferred to New England by ministers, partly trained as physicians, and the lowest class of medical men, the barber-surgeons. The ministers, some of whom became governors, and the other men of education, served the sparsely populated settlements fairly well; the barber-surgeons, more adventuresome than any of the regular physicians of the time, did the minor surgery. Much that was bad, therefore, in English and Continental medicine, including quackery, which might have been brought over by physicians of the higher classes, never reached the barren Massachusetts shore. American medicine, thus, became distinctive almost from the start and independence became its chief characteristic. Those elements which were transferred, however, were important, and an understanding of them is necessary in order to visualize medicine as practised in Massachusetts during the colonial period.

With the invention of printing, there was brought to medicine a new mode of propagation and medical books were published before 1500 in considerable numbers. The printed volumes were about half as expensive and much more numerous than the rare manuscripts which had preceded them. The task of translating the manuscripts into Latin, the scientific language of the day, fell into the hands of a number of medical humanists who lived about 1500. The most important of these, from our point of view, was Thomas Linacre (1460–1524), physician to Henry VII and Henry VIII, who received his M.D. from both Padua and Oxford. His outstanding work was his translation into Latin of the various treatises of Galen, published from 1517 to 1524; faithful and accurate, they had a wide circulation, not only in England, but on the Continent. These translations, used extensively in the schools, indirectly affected medicine in Massachusetts through the preacher-physicians who received their degrees from Oxford or Cambridge. Part of their course of study was certainly medicine, and the translations of Linacre brought Galen to them, thus adding a distinct Galenic touch to our early colonial period.

The Galenic system of medicine was widespread during the sixteenth and seventeenth centuries in Europe and it became the system of medicine practised in this country up to about 1700. It was based upon a theory that there were four elements in the world: fire, water, air, and earth, and four primary qualities: warm, cold, moist, and dry, corresponding to the four fluids: blood, phlegm, yellow and black

bile. The secondary qualities perceptible by the sciences were the result of variable admixtures of the elements. They were taste, smell, hardness or softness, wet and cold, warmth and dryness. The application of these general ideas to the theory of health and disease called, by way of complement, for direct investigation into the structure and functions of the human body. Thus it was necessary for the Galenic physicians to know some anatomy and physiology. The principles laid down by Galen of both anatomy and physiology were accepted without further investigation until the late sixteenth century.

Galen's pathology was founded upon natural philosophy and clinical observation, both of which assured him recognition of the cause and phenomena of diseases. Disease, accordingly, was only a disturbance of function, and the removal of the disturbance constituted a cure. Medicines were, therefore, used to expel forces which were disturbing the patient. The choice, the dosage, and the method of application of remedial measures were subordinated to well-defined indications which were inferred from the cause of the disease, and from its nature and symptoms, as well as from the individuality and habits of the patient. Galenic therapeutics included, in addition to definite remedies for symptoms, the influence of air and water baths, massage, exercise, and games.

Definitely opposed to Galenism were the theories of the cause and treatment of disease developed by Paracelsus (1493–1541). He disregarded all Galenism, including the theory of the four humors, and taught physicians to substitute chemical therapeutics, intro-

ducing into the pharmacopœia such drugs as laudanum, mercury, lead, sulphur, arsenic, and the sulphates. Paracelsus, also, did something to raise the standard of surgical procedure, described goitre, taught the unity of medicine and surgery and the natural healing of wounds without meddling. His main influence, however, was through his very striking personality. In an age when heresy often meant death, he recklessly overthrew superstitions, often at the risk of his own life. His importance to medicine in America lies in the fact that he brought to medicine certain of the metallic drugs previously unknown and, moreover, wrote about them in the vernacular, so that his works had a widespread influence among men not trained to read Latin.

A third figure who stood out boldly in European medicine was Vesalius (1514–1564). His anatomy, published in 1543, while written in Latin, was truly vernacular in spirit, in its violence of language and in its effort to overthrow Galenism and superstitions. The surgical theories of Ambroise Paré (1510–1590), the great surgeon of the Renaissance period, also may have had some influence indirectly upon medicine in Massachusetts, as he was the first to treat gunshot wounds rationally. Paré had a stimulating effect upon surgery, an effect which passed through English surgeons to America. He, too, wrote in the vernacular so that surgeons of the lower classes could read his works.

During this period there was steady improvement in the status of these barber-surgeons. In France shortly after 1500, they were taken under the wing of

the Paris faculty in spite of the protest of the surgeons proper. In England these same surgeons obtained special charters in the fifteenth century, and in 1540, under Henry VIII, the Barber Company was united with the small but exclusive Guild of Surgeons to form the United Barber-Surgeons Company. These same barber-surgeons found their way to America, one coming over on the Mayflower as surgeon to the crew.

The physicians of the time, too, became recognized and formed organizations. In 1546, the Regius Professorship of Medicine at Cambridge, England, was founded. The Royal College of Physicians of England, although not definitely chartered under that name, was organized by Thomas Linacre as early as 1518, and a local code of ethics appeared shortly in their statute books.

The sixteenth and seventeenth century physicians were familiar with various epidemic diseases which had swept over Europe, the most formidable of which were plague and syphilis. From 1500 on the plague was particularly severe on the Continent, breaking out from time to time in different places. Syphilis, too, although less malignant in character than in the fifteenth century, was ever present and a great number of remedies were developed to overcome it. Mercury was used extensively and, in addition, many new drugs were introduced from the western hemisphere. The earliest settlers who came to Massachusetts, moreover, were constantly on the lookout for drugs to take back to England. None were found, unfortunately, on the barren shores of New England. In addition, smallpox and measles appeared on the Continent,

and scurvy was rife whenever men travelled overseas. Typhus, or 'gaol fever,' was often encountered and there were definite epidemics during the fifteenth century in Cambridge, Oxford, and Exeter, England.

During the opening twenty years of the seventeenth century, there were no important medical events taking place in England, excepting, perhaps, the publishing of William Gilbert's book 'De Magnate' in 1600. He was physician to Queen Elizabeth. His work, however, was largely one of physics and did not influence medicine to any great extent.

We have thus seen that the principal element in medicine which could be transferred to this country, in 1620 and after, was the widespread belief in the Galenic principles by all physicians who could read Latin and held positions of importance. The spread of these principles was largely due in England to Thomas Linacre, the 'restorer of learning.' To offset this, however, there were definite trends in an opposing direction. Violent protests against all scholasticism, and especially Galenic theories as written in Latin, were made by such men as Paracelsus, Vesalius, and Paré. The influence of Paracelsus was considerable, as will be noted in future chapters. That of Vesalius was less definite, as there was no anatomy taught in America until well into the close of the eighteenth century. The influence of Paré can only be conjectured. His theory of the treatment of gunshot wounds may have carried over into this country. More important, perhaps, than these theories of disease were the actual facts of the various epidemics. Physicians as well as the whole populace were per-

fectly familiar with plague, typhus fever, syphilis, and smallpox. We shall see that the ministers were more familiar with these diseases than any one else during the colonial period in Massachusetts, and it was to them that the people naturally turned for instruction against them. The physicians made efforts to combat these diseases either on the principles of Galen or on those of Paracelsus, but it was soon discovered that the simpler remedies, such as rest, open air, and massage, were more efficacious than all the drugs mentioned in the early pharmacopœias. Thus some of the real principles established by Galen and long forgotten came into their own in America under frontier conditions of medicine and surgery. We shall see that generalized drug therapy lost more and more favor as time went on in the search for specific remedies and treatment by more drugless methods. This was especially so in regard to the noxious and distasteful medicines recommended by the earlier writers. Thus the practice of medicine in America during the seventeenth and eighteenth centuries assumed, almost at once, an independence of thought which has been one of the main characteristics of American physicians ever since.

CHAPTER II

THE COLONIAL PERIOD

1620–1700

With the landing of the Pilgrims at Plymouth, December 21, 1620, medicine may be said to have begun in Massachusetts, for Deacon Dr. Samuel Fuller, a physician of considerable ability, was one of the passengers on the Mayflower, and Giles Heale, a barber-surgeon, served with the crew. Fuller played an important part in the early years of the Plymouth Colony and also in the founding of the Massachusetts Bay Colony; Heale remained in Plymouth only a few months, sailing back on the Mayflower in April, 1621. Other physicians may have preceded these two in America, but none of them remained for any length of time. It is possible, although unlikely, that men with medical training touched the coast of Massachusetts before 1620, with Gosnold, Pring, or Weymouth. If so, we have no record of them. The story with regard to Captain John Smith's party in Virginia is somewhat different and, although it has no distinct bearing on the development of medicine in Massachusetts, it is worthy of record that three physicians, Dr. Wotton (1606), Dr. Russell (1607), and Dr. Bagnall (1608), accompanied the expeditions to Virginia and served as surgeons to Captain Smith. We presume that all of them returned shortly to England, for Smith himself says, when he was compelled to return to Europe on account of his own health in 1609,

'There was neither chirurgeon nor chirurgery at the fort.' In 1610 another physician, Dr. Bohun, came to this country, and, in 1611, accompanied Lord Delaware to the West Indies; he was later killed in a fight with a Spanish warship. This, then, was the fate of the physicians of the Smith expedition; a quite different story can be told of the Plymouth Plantation. Dr. Samuel Fuller remained in Plymouth or its vicinity until his death in 1633, a faithful servant to his people.

Fuller was born in Redenhall, Norfolk, England, a few miles south of Norwich, January 20, 1580, the son of Robert Fuller, a butcher. His family were well-to-do and long known as prosperous tradesmen; butchering was something of a profession in those days. Where young Fuller got his primary education, or how he fell in with the little band of Pilgrims gathering at Scrooby in the early years of the seventeenth century, is not clear from our records of him. He formed, however, a warm friendship with William Bradford, ten years his junior, and they, with William Brewster and others, went to Holland in 1609, finally settling in Leyden. Fuller had married previous to his departure from England, but his wife lived only a short time. After five years in Leyden, he married Agnes, the daughter of Alexander Carpenter, April 24, 1613. The Carpenters were said to be a family 'of superior position.' At least William Bradford, a man of a good family, was not considered at the time to be a suitable husband for Agnes' sister Alice, although he later married her in Plymouth, August 14, 1623. From this we may infer that Fuller was well thought of, although it is perhaps unfair to think of him as

superior to Bradford. Fuller's second marriage was also shortened by the early death of his wife, who was buried July 3, 1615. He married for his third wife, Bridget Lee, in Leyden, May 27, 1617.

During his eleven years at Leyden, Fuller took an active part in the affairs of the Pilgrims, not only in the negotiations with Cushman in the preparations for fitting out the Speedwell and the Mayflower, but also in the intellectual and social life of the Reverend John Robinson's congregation. He was considered a person of large means, was well connected by marriage, and seems to have been a man of force and character. While there he was made a deacon of the church, a signal honor, indication of the respect and trust placed upon him by Robinson.

We do not know at this period whether or not Fuller was also considered as a physician to the group as well as their deacon. His exact medical education is doubtful; when he left Scrooby, at the age of twenty-nine, he may have had some instruction in the art of medicine. He must have learned much, however, from William Brewster during the Leyden period. Brewster was a man of great learning and ability, a teacher, a printer of religious books, and the initiator of the plan for emigration to America. Like many of the clergy, Brewster was undoubtedly educated to the medical profession. While at Peterhouse, Cambridge University, he very likely read Hippocrates, Galen, and others. Thacher [1] states that 'as a precautionary measure in case of ejectment, a considerable number of clergymen of that period were educated to

[1] Thacher, James: *American Medical Biography.* Boston, 1828.

the medical profession, and not a few were eminent practitioners before they crossed the Atlantic.' Brewster, from what we know later, was one of them; Edward Winslow another. Fuller may have studied at the University of Leyden, founded in 1575, although his name is not found among the English-speaking students, or at the Botanic Gardens, founded in 1577, where much was to be learned about medicinal herbs. Opportunities to attend 'anatomies,' or dissections of the human body, were open to him. These demonstrations were both frequent and popular in Holland at the time. They are vividly depicted in the great canvases of the Dutch artists. Arend Pietersz' 'Anatomie' of Dr. Sebastian Egberts (1603) represents twenty-eight physicians, with high ruffed collars and Vandyke beards, gathered around the demonstrator, who is about to insert the scalpel into the cadaver before him; another picture, by Thomas de Keyser (1619), shows the same physician quizzically tickling the ribs of an hilarious skeleton, to the amusement of five of his friends. A third picture, by van Mierevelt, in the Delft Hospital, is a portrait of Dr. van der Neer and seventeen other figures, painted about the same period, with all the accessories of dissecting. Whether Fuller ever took a medical degree or not, is not known, but on the list of passengers on the Mayflower his occupation was given as physician and he was referred to as 'Dr.' Fuller by the men in the Massachusetts Bay Colony. Harrington [1] thinks, and we may agree with him, 'that while Fuller was well educated in clerical matters, his profession was

[1] Harrington, T. F.: *Bull. Johns Hopkins Hosp.*, 1903, XIV, 265.

medicine and it was as a physician and not as a minister that he came to this country.'

The Mayflower carried one hundred and two passengers, only thirty-five of whom were from the religious group in Leyden. The rest came from London, where the party was financed by a speculating company. The average man aboard might be considered as a farmer or a middle-class business man from England. They had been forced to leave their country, in part at least, because of the great unrest of the time, political, economic, and religious. The cost of living, in the latter part of the sixteenth century, had increased rapidly in England. It seems likely, however, that the ship's company were not prepared for the severe winter on Cape Cod, as they had originally planned to go to Virginia. Other Englishmen had preceded them to the Barbados and West Indies, where much milder weather prevailed; the passengers knew little of the climatic conditions which they were to meet.

The voyagers on the Mayflower, however, appear to have been comparatively free from serious sickness. Only one of the seamen died, probably of delirium tremens. Two days before land was sighted, William Button, a servant-student of Fuller's, died. In the logbook Button appears as 'servant-assistant to Dr. Fuller'; it seems probable that he may have acted more or less as an apprentice. The Leyden group on the Mayflower were in good physical condition, as Winslow states, 'they were the youngest and strongest of the Leyden congregation.' The ship itself was probably in excellent condition. It is thought to have

been in the wine trade for several years, and as a wine ship was known among sailors as a 'sweet' ship.[1] Three births were recorded on the Mayflower, probably attended by Fuller. One patient was his sister, Mistress White, who gave birth to Peregrine White.

On the ship also was Giles Heale, who came as surgeon to the crew. He was probably engaged by Thomas Weston as the ship's surgeon when Weston chartered the Mayflower. Heale had served as an apprentice in the Guild of Barber-Surgeons of London and had received the right to practise in 1619, the year before the Mayflower sailed. According to the regulations of the barber-surgeons, it was necessary for a surgeon to be part of the ship's company on passenger ships making voyages 'beyond seas.' His instrument and medical chest had to be examined before sailing. His name, for some unexplained reason, was not mentioned by Bradford, although he must have been considered as a passenger, being ship's surgeon to the crew of thirty-five. We find a record of him as one of the signers, with John Carver and Christopher Joanes, the captain of the ship, of the will of William Mullins, who died in February, 1621.[2] Heale returned on the Mayflower in April, 1621. He should be considered, nevertheless, as the first licensed practitioner definitely to serve in Massachusetts Bay. He retired to a practice in Drury Lane, London, made his will April 4, 1652, and was buried February 3, 1653.

During the first winter at Plymouth there was much

[1] Adams, J. T.: *The Founding of New England.* Boston, 1927.

[2] Banks, C. E.: *Proc. Mass. Hist. Soc.*, 1927, LX, 144, 217.

sickness and about half the Pilgrims died, especially in January and February of 1621. The diseases of which so many died are difficult to ascertain. It is well established that the Massachusetts Bay Indians had been swept by an epidemic of a very infectious disease a few years before, but what this disease was can only be conjectured. It may have been either plague or smallpox. Typhus fever or a virulent form of typhoid may have been the 'plague' mentioned. Patients with consumption, pneumonia, rheumatism, and scurvy probably made up part of the group who died at Plymouth. Fuller must have had a busy winter, but we know very little of him during that period or even for the next few years. He apparently looked out for illness in the Plymouth Colony, made short trips to visit other settlers, planted his own land, built his own house, acted as a deacon and advisor to the colony, and was generally considered as one of the leading citizens of the small band. We know that he bled patients, an almost universal practice in cases of fever at the beginning of the seventeenth century. Fresh groups of settlers, which occasionally landed at Plymouth, were treated by Fuller before being sent on to their new location. Such a group, for instance, left Plymouth in 1622 and settled in Weston.

By 1632 Fuller became well known, also, in the Salem and Boston colonies; we hear of his travelling frequently. Shortly after Governor Endicott arrived in Salem, he wrote to Governor Bradford asking for the services of Fuller, who, he had heard, had 'cured diverse of ye scurvie, and others of other diseases by letting blood, and other means.' In Endicott's colony

there was a great deal of scurvy, and although considerable animosity existed between the two groups, Fuller was sent, and John Endicott wrote later to the 'Governour of New Plymouth,' from, 'Naumkeak, May 11, Anno 1629': 'I acknowledge myself much bound to you for your kind love and care in sending Mr. Fuller among us, and rejoice much that I am by him satisfied touching your judgments of the outward form of God's worship.'

Governor Winthrop was also having difficulties in Boston. William Gager, who came from England with him, is spoken of as 'a right Godly man and skilful chyrurgeon,' but he died not long after his arrival. Fuller was sent to Charlestown to aid them in their distress and thus earned the thanks of Governor Winthrop and his colony. In 1630, Fuller wrote to Bradford, under the date of 'Massachusetts, June 28, Anno 1630,' saying, 'the gentlemen here lately come over are resolved to sit down at the head of the Charles river, and they of Matapan propose to go and plant with them. I have been at Matapan, at the request of Mr. Warham, and let some twenty of these people blood; I had conference with them, till I was weary.' Apparently poor Fuller not only did his medical work, but also found it necessary to enter into long religious arguments; from what we know of the conference it is perhaps no wonder he complains of being weary. This letter of Fuller's to Bradford, however, in addition to sending a report of his venesections, contained valuable news and expressed opinions about men and events. Fuller, on the whole, was optimistic about the colonies in spite of obvious

difficulties. Perhaps he was a trifle discouraged about the Matapan group, who were arguing religion when they should have been building houses or looking out for their sick. At all events, Fuller continued his letter with the following illuminating remark, 'Satan is busy; but if the Lord be on our side, who can be against us.' He wrote again to Bradford, this time from Charlestown, 'August 2, Anno 1630,' telling about a ship which had come in with plague on board: 'There is come hither a ship (with cattle and more passengers) on Saturday last which brings this news out of England; that the plague is sore, both in the city and country, also there is like to be a good death in the land by reason of the dry season — the sad news here is that many are sick and many are dead — I here but lose time and long to be at home. I can do them no good, for I want drugs and things fitting to work with.' Fuller must have sensed the contagiousness of the plague or typhus fever and knew that mere bleeding would not control the disease. He was handicapped greatly by lack of supplies and he presumably longed to be back in the Plymouth group, where sickness at that time was not so rampant.

Fuller's influence on both Endicott and Winthrop was considerable. The Salem settlement's rather unfriendly attitude toward the Plymouth settlers at first was changed through Fuller's work in rendering them aid when they were in need. Endicott's reports to England changed their tone at this time; the pessimistic note dropped out and ideas were expressed about the value of coöperation not only between the old country and the new but between the various colonies

settled here. It seems reasonable to suppose that Fuller's work played a part, at least, in stimulating Endicott's optimism.

Fuller died in 1633 of smallpox, a disease of which he must have seen many others die during his lifetime. In his will he laid special stress upon the perpetuating of learning among his children, and we cannot doubt that if he had lived three years later to see the beginnings of Harvard College, he would have been one of the instigators of that movement. His library contained only twenty-seven books, but he probably had access during his years of practice to the libraries of Brewster, Winslow, and Bradford. At the time of Fuller's death, Bradford wrote that Fuller 'had been a great help and comforte unto them; as in his faculties, so otherwise, being a deacon in ye church, a man Godly, and forward to doe good, being much missed after his death; and he and conversant rest of their brethren much lamented by them, and caused much sadness and mourning amongst them.'

The third Mrs. Fuller, who came to this country in 1623 on the Anne, practised midwifery, probably the first to do so in the colonies. In 1663, long after Fuller's death, the Town of Rehoboth voted to ask her to come and settle there as a midwife. The invitation, however, was not accepted, and Mrs. Fuller died the next year at Plymouth. Two children were born in this country: Mercy and Samuel. Samuel became a minister in the Plymouth Church in 1694.

So we leave Deacon Dr. Fuller, originally of the Reverend John Robinson's church at Leyden, who found a wider field for service in Plymouth and the

whole Massachusetts Bay Colony and did his work well. With or without a degree, he carried out his duties to his church and to mankind in a manner worthy of his profession, a respected leader, a skilful physician; working with scant resources, he cared for the sick and served to establish a bond of good will among the scattered colonies, a bond which helped to make permanent the plantations which might easily have failed as so many others had done before them. This, then, is Fuller's claim to fame. His position as doctor made possible his journeyings when called upon for help; his high character made him a trusted messenger; his ability and friendliness brought Endicott, Winthrop, and Bradford into closer accord.

From the time of Fuller's death in 1633, there was no outstanding physician in Massachusetts for nearly one hundred years. Medicine was served by three classes of people: the governors, of whom John Winthrop the younger is the leading example; the ministers, typified by Thomas Thacher; and a host of minor physicians, ministers, and schoolmasters, some with medical degrees and some without. It might be thought that few physicians were required in the sparsely settled country, but when John Winthrop came to Boston in 1630 with over two thousand people in his expedition, he was poorly equipped to handle epidemics, as Fuller's letters have shown us.

The governors served the country reasonably well from the medical point of view. They were not untutored in the medical literature of the day and they gave their knowledge freely. It will be recalled that

Edward Winslow, who came over in the Mayflower and married Fuller's sister, had considerable knowledge of medicine; it was Winslow who went in 1623 to see the Indian chief Massasoit. He attended him during the sickness from which Massasoit recovered. Governor John Endicott, too, in Salem, probably had some knowledge of medicine, although he called Fuller from Plymouth when scurvy was rife among his followers. Endicott's son, Zerubbabel, born in 1635, became a physician and practised in Salem.

The outstanding members, however, of the governing class who were acknowledged as physicians in the early years were the two Winthrops. John Winthrop, born in 1588, had been a student at Trinity College, Cambridge, England. He is described as having a 'piety of the self-accusing puritanic type.' He left his home in 1630, somewhat depressed over conditions in England, and came to Salem on the Arbella, later moving to Charlestown, where he met Endicott, who was struggling along with a community of about one hundred people. This small band was greatly augmented by Winthrop's group of two or three thousand. Because of lack of water in Charlestown, headquarters were soon established upon the neighboring peninsula of Shawmut, to which the name of Boston was given.

From Winthrop's 'Journal,' begun in 1629, we learn a good deal about medicine as it was practised at the time. Even more knowledge can be gained, however, from certain other contemporary documents, one of which was sent from England in 1643, to Winthrop, dated 'London May 6th 1643,' 'For

my worthy friend Mr. Wintrop,' containing eight pages of notes on herbs and their use in curing diseases. Apparently Winthrop wrote to the author, Edward Stafford (d. 1651), of London, a man of scientific interests, although not known to be a physician, requesting medical information for himself and others. The Stafford in question may have been the son-in-law of Elias Ashmole (1617–1692), the greatest English collector of his age and founder of the Ashmolean Museum at Oxford; he came from a distinguished family of Bradfield, Berkshire. In Ashmole's 'Diary' one finds only a note, under November 10, 1651, 'About 4 p.m. my wife's eldest son, Mr. Edward Stafford, died.' He was buried the next day in Bradfield Church. Many years later, Oliver Wendell Holmes was shown this letter, now in the Boston Medical Library; he published it with some notes showing the value of Stafford's communication to Governor Winthrop.[1] The letter was written with care and forethought; it contains besides advice as to the use of various cathartics and sudorifics, the following note on medical practice in general:

Nota bene. No man can with a good Conscience take a fee or a reward before ye partie receive benefit apparent: and then he is not to demand any thing, but what God shall putt into the heart of the partie to give him. And he is not to refuse any thing, that shall be so given him, for it commes from God.

A man is not to neglect that partie, to whom he hath once administred, but to visit him at least once a day, and

[1] Holmes, Oliver Wendell: *Proc. Mass. Hist. Soc.*, 1860–62.

to medle with no more, then he can well attend. In so doeing he shall discharge a good Conscience before God & Man.

The contents of Stafford's letter were taken from the 'Herball' of John Gerard (1545–1612), first published in 1597. The book was the most popular of all the English herbals and a second edition, enlarged and amended by Thomas Johnson, appeared in 1633, ten years before Stafford wrote to Winthrop. Gerard took most of his material from the great Latin herbal of Dodoens, claiming it to be a work of his own. Thomas Johnson, M.D., who edited the second edition, was an ardent royalist, a very able botanist and a prominent member of the Apothecaries' Company. He was made M.D. by the University of Oxford in 1643, in which year he published a translation of the works of Ambroise Paré. His edition of the herbal contains 2850 descriptions and it seems probable that Stafford gathered his material for his note to Winthrop largely from the 1633 edition, or from a reprint which appeared three years later.

It must be supposed that Winthrop used this knowledge in giving advice to his people, largely through the medium of writing letters but perhaps by actually seeing patients and talking to them. The knowledge received from Stafford's letter was as good as could be obtained at the time, and we should not doubt that Governor Winthrop treated patients as well as the average physician would have treated them in England.

The relationship between the people and their Governor from a medical point of view can even be

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better illustrated by the work of John Winthrop the younger (1606–1676), the gifted son of the first Governor of Massachusetts Bay Colony. He received his education at the Bury St. Edmunds grammar school and at Trinity College, Dublin, travelled through Europe, especially in Italy and the Levant, and finally, in 1631, followed his father to New England, where he was soon made assistant in the Massachusetts Bay Colony. In 1633 he led a company to Agawam (now Ipswich) and made a settlement there. Winthrop did not stay long in this new community, sailing within a year to England, where he received a commission as governor of a settlement on the river Connecticut. He went there and built a fort at Saybrook, later returned to Ipswich, moved to Salem, and then went back to England again in 1641. He came back to New England in 1643 and moved to Pequot (now New London) in 1646, where he made his residence for eight years. In 1657 we find him in Hartford and after a short interval he served as governor of Connecticut to the time of his death in 1676.

From his youth he was interested in scientific studies and a great reader of books; at his death he left a library of more than one thousand volumes. Alchemy attracted him, as it did many of the scientific men of his day, and among his correspondents was the alchemist Sir Kenelm Digby (1603–1665). Winthrop also owned a telescope and studied astronomy. When the Royal Society of England was founded in 1661 he was proposed as a member and was admitted in 1662; during that and part of the

next year he took an active part in the society proceedings.

When Winthrop the younger returned to Connecticut, he found a scarcity of physicians in his colony and, expressing a willingness to give medical advice, he was much consulted, patients writing to him not only from Connecticut but from Massachusetts and Rhode Island. The type of medicine he practised can be gained from a letter he wrote in 1652 to a Mr. Odell about his child:

Pequot Novemb: 27, 1652

Sr

I received your letter about 2 daies since wherin you desire directions concerning your child, wch indeed is very uncertaine to doe in the absence of the pty, it being difficult to find out the true cause & seat of the originall of such disease by the most diligent & curious observation, when the patient is dayly present: for though by your description I iudge it to be a palsy, yet the cause of that diseas is often very differing for in Some it is through too much drinesse in some too much moisture in some the cause is in the Nerves of the third coniugation of the braine sometymes in other nerves, in others it hath its originall in ye marrow of the back bone: This seems to be that kind wch we call Hemiplegia where one halfe of the spinall marrow is affected or (wch is often in others, and makes me doubt it may be so in this child, by reason of the suddainnesse wherewth she was stroken) it may come fro a light apoplexye (a stronger Apoplexye is comoly present death) This lighter kind of Apoplexy strikes suddainly & leaves comoly one side wthout sence or motion, and after continueth it wholy paraliticall: it may also come fro some thick flegme stopping the influence and distribution of ye vitall spiritts in the nerves, wch may also cause that suddaine apoplecticall stupor.

The cure depends upon the knowledge of the right cause, and not only that but the constant and due application of such things as may conduce thereto, wch is difficult to doe at a distance. I am not provided of things alwaies ready for such cures yt are usuall to be had ready made in other places at the Apothecaries, and am forced to prepare things myselfe in such cases when any neighbours doe want helpe and therfore am not able to send you many things that might be usefull, and I suppose it would be uselesse to prescribe you such receipt as phisitians comend in these cases wch I know it is not probable any of them to be had wth you, if the child were nere me I might doe mine indeaveur to provide such things as I could heave make my selfe and see to the due administration therough, otherwise I accout it an hopelesse to direct for the cure of so dangerous a disease wherein the best meanes often faile of helpe: some generall things that may be helpfull in all kinds of those disease I shall mention — there is a coldnesse comoly accopanes this disease, whatever other cause be, therfore warmeth by aplication of hares or ffox ffurre (wch is also specificall to paralitical disteprs) or in want therof Racoones or lamb or swanes or such can be had: also artificall meanes of heat by hott clothes, hott trenchers or brickes wraped up in cloths aplied to the place most benumnd also oyntments of hott chimicall oyles as of rosmary tyme Origanu also oyle of castor mixed wth a greater quantity of oyle of wormes & fox grease, or for want of these wth fox grease alone: or wch is counted very efficatious the Balsam of Guido if you have any (it is any ordinary knowne oyntmet) though at present I have none of it but have sent you an other oyntment instead wherof wth wch or wth any of the other if they be to be had anoynt the whole backe bone as hott as can be indured & that side that is affected twice a day covering it presently wth hott clothes, also the aplying of cupping glasses to the heads of the muskles, they might be such glasses as have very narrow mouths and

must be aplied wthout scarification, & wth a great & quick flame but must not continue as long as in other cases, but be often reiterated and a plaister of Colophony frankincense & rosin wth the pouder of Bayberries, these mixed wth as much melisett plaister all melted together & made into a plaister, and aplied to the places after the cupping glasses, also some bathes wherein the decoction of Betony Rosmary sage in a quanty of sweete sacke or muskadell but better the spiritts of those herbes, & other hot herbes mixed wth it: but speciall care must be in the using of a bath least it overcome the patient or too much relax the nerves by being too long in it or too hott aplied: I use in such cases a bath of minerall spiritts wch I find both safe & effectuall in many cases coming neere the virtue of the naturall bathes wch must be used immediately after it is prepared, therfore I never prepare it but as it is used, nor cannot contrive a way to supply you wth it so farre of: I comend also to be used inwardly the decoction of Guaicu & Sassaparilla also some drops of spirit of rosmary in bere if it may be had, or in want of it Rosemary boyled in broth & so taken often, a vomitt in some kind of such disease is usefull but not in every kind, an Issue on the contrary arme or legge as the nature of the disease apeares if most upward in the legge if most downward in the arme may be usefull: but if she be of a very spare bode it will not be good: this is what I ca for present advise. So wth loving salutations to yourselfe & wife wth Mr. Howell Mr —— (Ford) & thous I rest

Your loving freind

J. WINTHROP

The letter indicates Winthrop's point of view as being distinctly Galenical; there is 'too much drinesse' or 'too much moisture.' The nature of the paralysis, a partial palsy of the hemiplegic type, is however, recognized, as it would have been by Galen

himself. The 'coldnesse' was to be treated by the application of heat, 'hares or ffox ffurre,' which were considered specifics, various ointments, one of which he sends, to be anointed on 'the whole backe bone as hott as can be indured,' cupping to the muscles followed by plasters and baths. In addition the child was to take guaiac and sarsaparilla by mouth and a vomit. In spite of all these remedies, the patient probably survived; none of them could do much harm. The family, moreover, must have been entirely satisfied with the dictates of their good Governor whose knowledge was so much superior to any one's else in the community. As a matter of fact from this letter we may judge that Winthrop had as good a knowledge as the average medical graduate of his day.

Another letter from a Mr. Stone about his child, written 'To the right Worsfull his much honored friend John Winthrop at Pequot,' in 1652, also shows the type of advice that was often sought:

Worthie Sir

I am bold to write a few lines about our child. he is 23 weeks old, hath been somewhat ill 3 or 4 weeks, unquiet, his eyes looking yellow, having a cough, especially when he takes his vistuals. wee thought he might have been breeding teeth: but about a week past we peceived yt. he had the yellow Jaundise. By Mrs. Hooker her advice we gave him Barbaric barke boyled in beer, wth saffron, twice a day, for two dayes together. & one time saffron alone. Also lice 2 or 3 times & Turmerick twice. we hoped yt. the Jaundise had been cured: because he was sometimes more chearefull & had a better appetite, but the last Saterdaie at night he was very unquiet heavie & could not sleep & upon the Sabbath seemed to looke

somewhat swart in the face. In the afternoone we gave him about 3 quarters of a grain of your purging powder, which we had of Mrs. haynes which caused him to vomit twice or thrice, & to purge downwards thrice. he slept well the night after & in the morning was somewhat unquiet again as before, wringing & winding back. his cough seems to increase, as if he had much fleagme. he seems to be sick at times but without any conulsion or starting fits. when he began to be ill, he was costive in his bodie, but now is in good temper. he doth burne often but a little sometimes.

I pray Sir send me word whether he may not take some more of that pouder & what quantity. If you thinke it conveient to prescribe anything I pray speake to Mr. Blinman I know he will pcure some Indian to bring your note & I will please him for his journey. I am much indebted to you for your kind entertainment of me when I was wth you: we remember our service to yourselfe & Mrs. winthrop, & our respect to Mr. Lake wth our love to Mr. Blinman & hoping yt we shall see you in our pts shortly I rest

Your servant in ✠
SAM: STONE

Hartford ffebr. 28, 1652

There are many such letters extant [1] indicating the extent of Winthrop's practice. He also wrote letters to his sons, occasionally noting something in regard to medicine; correspondence was kept up with learned men of England. John Winthrop the younger, therefore can be considered as a leading type of governor-physician, who sought the best medical knowledge of the day and gave it freely to all, at a time when there were no trained physicians in New England.

[1] Boston Medical Library.

Next to the governors, the ministers were the leading spirits in medicine. Deacon Dr. Samuel Fuller should be considered as the outstanding man of this group, but we must suppose that Fuller had more medical knowledge than many of those who followed him. He was, moreover, never strictly speaking a minister, although closely connected with the early church at Plymouth. The 'angelical conjunction' between the offices of minister and physician, referred to later by Cotton Mather, was best exemplified in the person of Thomas Thacher, the outstanding Puritan preacher-physician of his time. He was born in England, May 1, 1620, the son of the Reverend Peter Thacher, and emigrated to the Massachusetts Colony when he was about fifteen years of age, after having refused higher education in the English universities. Some time after reaching this country, in 1635, he put himself under the instruction of Charles Chauncy, the impoverished pastor of the church at Scituate, who probably received some instruction in medicine at Cambridge, England, and was one of the most learned men of the time. Chauncy later became the second president of Harvard College. Under his instruction, Thacher acquired not only a knowledge of the ordinary branches of a liberal education, with considerable emphasis on Hebrew and Arabic, but an understanding of the elements of medicine. Ordained as minister at Weymouth in 1644, Thacher removed to Boston in 1669 when he was chosen pastor of the Old South Church. In this position he is said to have devoted much of his time to the practice of medicine. He was

regarded by his fellow colonists as one of the most eminent physicians in Boston. He died October 15, 1678, following 'a visit to a sick person,' presumably from a fever.

Towards the close of Thacher's life, he wrote a short article on smallpox and measles, the first medical paper to be published in this country. It was printed in Boston, 1677, by John Foster, who had set up his press in 1674, one of the earliest presses in the colony. Thacher's broadsheet, entitled 'A Brief Rule to guide the Common People of New England how to order themselves and theirs in the Small Pocks, or Measles,' was printed in double columns on one side of a sheet.[1] The leaflet is actually an abbreviated extract from the writings of the English physician, Thomas Sydenham, but this should not detract from Thacher's work, as not only did Thacher disclaim all originality, but he took pains to inform the reader that he was not a physician. That he selected a good model is to his credit. It is thought that the leaflet was designed for actual posting or as a circular for public instruction during the epidemic of smallpox in the winter of 1676–77.

A BRIEF RULE

To Guide the Common People of New-England
How to order themselves and theirs in the Small Pocks, or Measles.

The *Small Pox* (whose nature and cure the *Measles* follow) is a disease in the blood, endeavouring to recover a new form and state.

[1] There is only one copy known, now in the possession of the Massachusetts Historical Society.

2. This nature attemps. 1. By Separation of the impure from the pure, thrusting it out from the Veins to the Flesh. 2. By driving out the impure from the Flesh to the Skin.

3. The first Separation is done in the first four dayes by a Feaverish boyling (Ebullition) of the Blood, laying down the impurities in the Fleshy parts which kindly effected the Feaverish tumult is calmed.

4. The second Separation from the Flesh to the Skin, or *Superficies* is done through the rest of the time of the disease.

5. There are several Errors in ordering these sick ones in both these Operations of Nature which prove very dangerous and commonly deadly either by overmuch hastening Nature beyond its own pace, or in hindering of it from its own vigorous operation.

6. The Separation by Ebullition in the Feaverish heat is over heightned by too much Clothes, too hot a room, hot *Cordials*, as *Diascordium*, *Gascon powder* and such like, for hence come *Phrenzies*, dangerous excessive sweats, or the flowing of the Pocks into one overspreading sore, vulgarly called the Flox.

7. The same separation is overmuch hindred by preposterous cooling that Feaverish boyling heat, by *blood letting*, *Clysters*, *Vomits*, *purges*, or *cooling medicines*. For though these many times hasten the coming forth of the *Pox*, yet they take away that supply which should keep them out till they are ripe, wherefore they sink in again to the deadly danger of the sick.

8. If a *Phrensie* happen, or through a *Plethorie* (that is fulness of blood) the Circulation of the blood be hindred, and therefore the whole mass of blood choaked up, then either let blood, Or see that their diet, or medicines be not altogether cooling, but let them in no wise be heating, therefore let him lye no otherwise covered in his bed than he was wont in health: His Chamber not made hot with fire if the weather be temperate, let him drink small Beer

only warm'd with a Tost, let him sup up thin *water-gruel*, or *water-pottage* made only of Indian Flour and water, instead of *Oat-meal*: Let him eat *boild App'es:* But I would not advise at this time any medicine besides. By this means that excessive *Ebullition* (or boyling of his blood) will by degrees abate, and the Symptoms cease; If not, but the blood be so inraged that it will admit no delay, then either let blood (if Age will bear it) or else give some notably cooling medicine, or refresh him with more free Air.

9. But if the boiling of the blood be weak and dull that there is cause to fear it is not able to work a Separation, as it's wont to be in such as have been let blood, or ar fat, or Flegmatick, or brought low by some other sickness or labour of the (Gonorrhea) running of the Reins, or some other Evacuation: In such Cases, *Cordials* must drive them out, or they must dy.

10. In time of driving out the *Pocks* from the Flesh, here care must be had that the *Pustules* keep out in a right measure till they have attain'd their end without going in again, for that is deadly.

11. In this time take heed when the *Pustules* appear whilst not yet ripe, least by too much heat there arise a new *Ebullition* (or Feaverish boyling) for this troubles the driving out, or brings back the separated parts into the blood, or the Fleshy parts over-heated are disabled from a right suppuration, or lastly the temper of the blood and tone of the Flesh is so perverted that it cannot overcome and digest the matter driven out.

12. Yet on the other hand the breaking out must not be hindred, by exposing the sick unto the cold. The degree of heat must be such as is natural agrees with the temper of the fleshy parts: That which exceeds or fall short is dangerous: Therefore the season of the year, Age of the sick, and their manner of life here require a discreet and different Consideration, requiring the Counsel of an expert Physitian.

13. But if by any error a new *Ebullition* ariseth, the same art must be used to allay it as is before exprest.

14. If the *Pustules* go in and a flux of the belly follows (for else there is no such danger) then *Cordials* are to be used, yet moderate and not too often for fear of new *Ebullition.*

15. If much spitting (*Ptyalismus*) follow, you may hope all will go well, therefore by no means hinder it: Only with warm small Beer let their mouths be washed.

16. When the *Pustules* are dryed and fallen, purge well, especially if it be in *Autumn.*

17. As soon as this disease therefore appears by its signs, let the sick abstein from Flesh and Wine, and open Air, let him use small Beer warmed with a Tost for his ordinary drink, and moderately when he desires it. For food use *water-gruel, water-pottage,* and other things having no manifest hot quality, easy of digestion, boild Apples, and milk sometimes for change, but the coldness taken off. Let the use of his bed be according to the season of the year, and the multitude of the *Pocks,* or as sound persons are wont. In Summer let him rise according to custome, yet so as to be defended both from heat and cold in Excess, the disease will be the sooner over and less troublesome, for being kept in bed nourisheth the Feverish heat and makes the *Pocks* break out with a painful inflamation.

19. In a colder season, and breakforth of a multitude of *Pustules,* forcing the sick to keep his bed, let him be covered according to his custome in health, a moderate fire in the winter being kindled in his Chamber, morning and Evening: neither need he keep his Arms alwayes in bed or ly still in the same place, for fear least he should sweat which is very dangerous especially to youth.

20. Before the fourth day use no medicines to drive out, nor be too strict with the sick; for by how much the more gently the *Pustules* do grow, by so much the fuller and perfecter will the Separation be.

21. On the fourth day a gentle *Cordial* may help once given.

22. From that time a small draught of warm milk (not hot) a little dy'd with *Saffron* may be given morning and evening till the *Pustules* are come to their due greatness and ripeness.

23. When the Pustules begin to dry and crust, least the rotten vapours strike inward, which sometimes causeth sudden death; Take morning and evening some temperate *Cordial* as four or five spoonfuls of *Malago Wine* tinged with a little *Saffron*.

24. When the *Pustules* are dryd and fallen off, purge once and again, especially in the *Autumn Pocks*.

25. Beware of anointing with *Oils*, *Fatts*, *Ointments*, and such defensives, for keeping the corrupted matter in the *Pustules* from drying up; by the moisture they fret deeper into the Flesh, and so make the more deep Scarrs.

26. The young and lively men that are brought to a plentiful sweat in this sickness, about the eighth day the sweat stops of itself, by no means afterwards to be drawn out again; the sick thereupon feels the most troublesome disrest and anguish, and then makes abundance of water and so dyes.

Few young men and strong thus handled escape, except they fall into abundance of spitting or plentiful bleeding at the nose.

27. Signs discovering the Assault at first are beating pain in the head, Forehead, and temples, pain in the back, great sleepiness, glistring of the eyes, shining glimmerings seem before them, itching of them also, with tears flowing of themselves, itching of the Nose, short breath, dry Cough, oft neezing, hoarseness, heat, redness, and sense of pricking over the whole body, terrors in the sleep, sorror and restlessness, beating of the heart, *Urine* sometimes as in health, sometimes filthy from great *Ebullition*, and all this or many of these with a Feaverish distemper.

28. Signs warning of the probable Event. If they break forth easily, quickly, and soon come to ripening, if the Symptoms be gentle, the Feaver mild, and after the breaking forth it abate; If the voice be free and the breathing easie; especially if the Pox be red, white, distinct, soft few, round, sharped top'd, only without and not in the inward parts; if there be large bleedings at the nose. These signs are hopeful.

29. But such signs are doubtful, when they difficultly appear, when they sink in again, when they are black, blewish, green, hard, all in one, if the Feaver abate not with their breaking forth, if there be Swooning, difficulty of breathing, great thirst, quinsey, great unquietness, and it is very dangerous, if there be ioyn'd with it some other malignant Feaver, called by some the pestilential Pox: the *Spotted Feaver* is oft joyned with it.

30. Deadly signs if the *Flux* of the *Belly* happen, when they are broke forth, if the Urine be bloody, or black, or the *Ordure* of that Colour; Or if pure blood be cast out by the Belly or Gumms: These signs are for the most part deadly.

These things have I written Candid Reader *not to inform the Learned* Physitian *that hath much more cause to understand what pertains to this disease than I, but to give some light to those that have not such advantages, leaving the difficulty of this disease to the* Physitians Art, *wisdome*, and *Faithfulness: for the right managing of them in the whole Course of the disease tends both to* the Patients *safety*, and the Physitians *disired Success in his Administrations: For in vain is the* Physitians *Art imployed, if they are not under a* Regular Regiment. *I am, though no* Physitian, *yet a well wisher to the sick: And therefore intreating the Lord to turn our hearts and stay his hand, I am*

A Friend, Reader to thy Welfare,
THOMAS THACHER

21. 11. 1677/8.

Boston. Printed and sold by *John Foster*, 1677.

The broadsheet method of spreading news of epidemics in a town of five thousand inhabitants was a natural one for Thacher to take advantage of, as there was no newspaper printed at the time. There were other similar broadsides published in succeeding years; the authors of many are not known. A second edition of Thacher's leaflet was printed in 1702.

Thacher's work was clearly an advance on that done by Fuller or Winthrop the younger, for, coming later, he felt the influence of Thomas Sydenham (1624–1689), the great English clinician, 'the reviver of the Hippocratic methods of observation and experience.' Sydenham, by throwing aside all the medical theorizing and scientific experimentation of his time and substituting good sense, was the first great modern clinical physician. He wrote first-hand accounts of diseases, separating scarlatina from measles and identifying it by its present name, described malarial fever, gout, pneumonia, dysentery, and chorea. He was the innovator of fresh air in sickrooms, cooling medicines in smallpox, iron for chlorosis, and he avoided many of the filthy ingredients of the pharmacopœia of his time. Much of his work was lost to the physicians and people of Massachusetts for many years and except for Thacher's 'Brief Rule,' the revolution Sydenham was leading in England failed to reach this country.

In the meantime, however, numerous physicians, preachers, and others carried on the practice of medicine, sometimes well but often badly. Fortunately, most of the people were healthy, living vigorous outdoor lives as pioneer planters. The

family medicine-chest, too, cared for most of the common illnesses, and except for periods of epidemics, especially in Boston, physicians were not badly needed. Those in practice that we know about seem to have done their work reasonably well and a number of them are worthy of record.

The Apostle Eliot was skilled in medicine and tried to teach the Indians some good general principles. It was he, also, who called attention to the work of Giles Firmin. Eliot, in writing to a minister in Cambridge in 1647, referred to the needs of medical instruction for the Indians, using these words: 'Our young Students in Physick may be trained up better than they yet bee, who have only theoreticall knowledge, and are forced to fall to practise before ever they saw an Anatomy made, or duly trained up in making experiments, for we never had but one Anatomy in the Countrey, which Mr. Giles Firman now in England, did make and read upon very well, but no more of that now.' The man referred to combined the offices of physician and preacher and taught a few disciples who gathered around him. He was born at Ipswich, England, in 1614, attended Emmanuel College, Cambridge, England, in 1629, and studied medicine there. In 1632 he came to Massachusetts Bay Colony with his father, and was soon made a deacon in the First Church of Boston. In 1638 he was granted one hundred and twenty acres of land in Ipswich; he practised medicine there and apparently taught anatomy. By 1647 he had returned to England, became the vicar of Shalford, Essex, was ejected from the church in 1662, and for

the remainder of his life practised medicine in England, but at the same time wrote many religious pamphlets. On February 14, 1640, after Firmin had been in Ipswich a year or so, he wrote Governor Winthrop as follows: 'Only for matter of employment I have as much here as I desire, and love my planting more than it, only the highest ambition of my thoughts and desires is to be useful and serviceable here in a common way. We have diverse very ill; the fluxes and fevers, I observe are very dangerous.' The town of Ipswich had been settled only five years and the number of inhabitants was small, probably not more than three or four hundred. Firmin had been a little discouraged, prior to the above-mentioned letter, for he wrote to Governor Winthrop the previous autumn, asking permission to settle in another township. He said, 'I am strongly sett upon to studye divinitie, my studyes else must be lost, for physick is but a meene helpe.' The same year he married Susanne, the daughter of the Reverend Nathaniel Ward, minister of Ipswich. Ward, poor and unhappy, was anxious to return to England. Firmin sailed first, however, in 1644, while his wife and children followed in 1646.

Firmin was probably the first anatomical lecturer in this country. His instruction must have been crude and comprised little more than informal talks about the dry bones before him, but even this would be a great help to learners. He seems to have stimulated an interest in the subject of anatomy, for recommendations were made at a session of the General Court in 1647 that 'such as studies physick or chi-

rurgery may have liberty to reade anatomy, and to anatomize once in foure yeares some malefactor.' These anatomical demonstrations may have taken place, although there was no definite instruction in anatomy or medicine for many years after this date. The medical department of Harvard College was not founded until the latter part of the next century.

In addition to Firmin there were certain other physicians, or men who practised physic, who should be mentioned. One is John Clarke (1609–1676), who was referred to as 'a physician of London.' He was driven from Massachusetts Bay in 1638 and went to Rhode Island, settling at Newport. He practised there and was a pastor of the Baptist Church, founded in 1644.

Another John Clark (1598–1664) was the leading physician of his time and the founder of a famous family of physicians. Coming to America about 1638, he appears in the records of Boston, March, 1651. He is said to have earned a medical diploma in England, especially for 'the cutting of stone.' He practised medicine in Boston and probably did considerable surgery. Clark also was a breeder of horses and kept a large stable in Plymouth; one of his breeds, known as Clark's breed, was noted in New England for many years. His estate amounted to over twelve hundred pounds, and medicines and drugs are listed as ten pounds. Books and surgical instruments were left to his son. This John Clark, the first regular medical practitioner in New England, was the founder of a long line of physicians, all of whom were named John. We are familiar with seven of them; the last one died

in 1805. The second practised medicine in Boston and died in 1690; he was a nephew of Sir Richard Saltonstall. The third John Clark, a brother of Cotton Mather's second wife, graduated from Harvard in 1687 and died in 1728. He was active in politics and became Speaker of the House. The story is told of an interesting incident happening while the House was in session in Cambridge. One of its members from Boston was seized with the smallpox and died within a few days. The Speaker, Clark, who was the outstanding physician in Boston of the time, is thought to have brought the infection from a patient to his brother member of the House. This idea so terrified the General Court that it was not possible to keep them together. When the third John Clark died, he left all his instruments and utensils of surgery to his son, the fourth John Clark. Included in his estate was an oil painting of the first John Clark, which is now in the Boston Medical Library. If painted in this country, it must have been one of the earliest oil paintings to be done in the colonies, as the subject of the portrait died in 1664. The fourth John Clark (1698–1768) also practised in Boston. His son died before him, so he bequeathed his books to his grandson, the sixth John Clark, a graduate of Harvard College in 1772, who in turn handed the things down to the seventh, the last of the line, who was graduated by Harvard College in 1799, and received his M.D. degree in 1802. He died in Weston, January 27, 1805, leaving no male issue. It will be noted that only the last member of the Clark family received an M.D. degree, except possibly the first member, who is said

to have earned a medical diploma in England. The history of this family illustrates the way medical education was usually carried on in the seventeenth and eighteenth centuries in New England; son was taught by father, and not only was knowledge propagated in this way but the surgical instruments and the library of the physician were handed down also. With this system so successfully in vogue, there must have seemed to the physicians of the earlier time little need for a medical school.

Of the other physicians we know little except their names and the fact that they practised in Boston. Among early passengers in Winthrop's fleet was Richard Palgrave, a physician from Stepney, London. He settled in Charlestown and lived there about twenty years. John Pratt, a surgeon, came over a little later and lived for many years in Cambridge. George Emery of Salem apparently did not have a very good reputation, for he was fined forty shillings in November, 1657, 'for changing a bottle of water of Goody Laskin.' Presumably this refers to the old practice of urine casting; the bottle of water was held up to the light and changes in the color or amount of sediment were thought to have had great significance. Emery may have added something to the bottle to have caused a change in the color or in the amount of sediment deposited, thus terrifying his patient unjustly.

Of the early presidents of Harvard College, founded in 1636, it should be pointed out that Leonard Hoar, who succeeded Charles Chauncy, was a regular graduate in medicine of Cambridge, England. Presi-

dent Chauncy did not receive a medical degree, although partly trained in medicine. He left six sons, all of whom were educated at Harvard College and became preachers and physicians. They had, according to Cotton Mather, 'an eminent skill in *Physick* added unto their other Accomplishments; which like him (their father), they used for the Good of many; as, indeed, it is well known, that until Two Hundred Years ago, *Physick* in *England*, was no Profession distinct from Divinity.' John Rogers, the first president of Harvard College who graduated from that institution, was also a practitioner of medicine; Michael Wigglesworth, who graduated in 1651 and became pastor of a church in Malden, had a large medical practice and was accounted a skilful physician. Elisha Cooke, graduating in 1657, was born in Boston and was one of the first natives to study medicine; although he did not have a medical degree, he practised extensively. Thomas Oakes, the brother of President Oakes of Harvard College, was also a physician.

With so much knowledge of medicine shown by the early members of Harvard College, it might be thought surprising that a medical department was not founded before 1781. The Church, however, was the first consideration of the College. The funds were small and there was really not so much need for a school as might be thought at first. A few well-educated physicians shared with the clerical physicians the fullest confidence of the community. The apprentice system of teaching was successfully carried out in many families, such as that of the John Clarks.

The early history of medicine in the colonial times cannot be separated from that of theology. It will be remembered that many of the courses of study at Cambridge and Oxford included medicine as well as theology. No European physician of repute came to the colonies, but those physicians who did come were a combination usually of physician, minister, and schoolmaster.

By 1645 we notice a trend in the other direction in that graduates of Harvard College went to Europe for their medical education. Of the first graduating class in 1642, two studied medicine abroad: Samuel Bellingham, who went to Leyden, Henry Saltonstall, who went to Oxford; John Wilson, son of the pastor of the first church built in Boston, also graduated at the first Commencement and later practised medicine. The number going to Europe, however, soon became small, because those who returned educated their own families or took in students from other families and the need for a medical degree from Europe was slight.

We know of twenty-six graduates of Harvard College, before 1700, who practised medicine in New England. Among them, in addition to those mentioned above, were John and Samuel Alcock, John Glover, Samuel Bradstreet, Gershom Bulkeley, Benjamin Thompson, Daniel Mason, Daniel Allin, Thomas Scottow, James Oliver, John Clark, Nathaniel Williams, Thomas Little, Oliver Noyes, Elisha Cooke, Jr., Samuel Mather, Jr., and John Bulkeley. Of the whole list, only Leonard Hoar and John Glover are known to have received the degree of M.D.

Before 1700 there was, of course, in this country no medical journal and only one newspaper, and that late in the century, and the only medical publication was Thacher's 'Brief Rule.' Probably not more than four or five autopsies were done during the period. Medicine outside of Boston fell to a rather low standard. Except for the work of Giles Firmin, who taught a little anatomy, there was no organized instruction in medicine.

The character of the diseases that prevailed in the seventeenth century in the colony was on the whole indefinite. 'Fever' was the usual diagnosis. One of the older writers, the Reverend Mr. Danforth, of Roxbury, wrote, in 1660, that his community had been visited 'with epidemical colds, coughs, agues, & fevers.' About this time there was also a note that diphtheria or a similar disease occurred in the same community. In 1761 the same author reported, 'This summer many were visited with ye ague & fever'; a little later there were 'fluxes & vomiting at Boston.' John Josselyn, writing in his book 'An Account of Two Voyages to New England,' 1674, speaks of arriving in Boston in 1671 and finding 'the Inhabitants exceedingly afflicted with griping of the guts, and Feaver, and Ague, and bloody Flux.' Late in the century, from 1691 to 1693, there was an epidemic of yellow fever in Boston. The settlers in the main led quiet and unexciting lives. There was little tendency to mental disorder although milder nervous disorders, such as hysteria, were more or less prevalent. Twenty years before the outbreak of the witchcraft episode at Salem (1691) there was a well-marked case of

hysteria reported in Groton which at the time was considered to be a case of witchcraft. Much of the medical atmosphere of the time came from the mother country, where the royal touch for the King's evil, or scrofula, was used throughout the period. It is recorded that a sum of money was petitioned for in 1688 in Boston to send a man with scrofula to England to receive the King's touch.

The colonial authorities began to take steps early to guard the ports of Boston and Salem against the introduction of infectious or contagious diseases. In March, 1648, an order was passed establishing a strict quarantine over all vessels, prohibiting the landing of persons or goods from such vessels until the Council saw fit to decree otherwise. At this time, plague was prevalent in the West Indian Islands. The next year, in May, the order was rescinded, word having been received from the Islands that plague was no longer rampant. There was no requirement for further orders of a like nature until October 11, 1665, when a warrant was issued by the General Court ordering all vessels coming from England to be placed in quarantine, this order being the result of the prevalence of plague in London. The order lasted two years, when it was rescinded. Quarantine was established on one of the islands in Boston Harbor. These two orders appear to have been made to meet special emergencies. They comprise the whole legislation of the seventeenth century so far as it relates to quarantine in Massachusetts.

Yellow fever made its appearance in Boston about 1693, being brought from the Barbados by the fleet

under the command of Sir Francis Wheeler. Sewall notes in his 'Diary,' under the date of June 13, 1693, 'severall of the Frigotts came up above Long Island,' and a short time later a man died in the hold of one of the ships. He records further that, 'the town is much startled at it.' By July 24th a number of people had died.

The standards of practice among the early physicians varied considerably. Many doctors of the time played upon the credulity of the people; secret medicines were advertised and extraordinary cures reported. This practice led to definite inquiry and laws were enacted from time to time to suppress irregular medical practice. As early as 1631, for instance, Nicholas Knopp (or Knapp) was sentenced to be fined and whipped 'for takeing upon him to cure the scurvey by a water of noe worth nor value, which he solde att a very deare rate.' The Court was considerably exercised in regard to the questions of physicians' fees and some laws were passed on this aspect of practice. In 1649 a law was enacted which was creditable to the wisdom of the time. It regulated within certain limits the practice of medicine and surgery and required the practitioner to act according to the most approved precepts of the art. It was a salutary enactment, as far as it went, but it afforded only slight protection against the deficiencies of the profession as it made no provision for educating medical men and established no tests for their qualifications. It was, however, the first enactment of the colonial authorities to restrain the quackery of the day.

'*Chirurgeons, Midwives, Physitians.*

Forasmuch as the Law of God allowes no man to impaire the Life, or Limbs of any Person, but in a judicial way;

It is therefore Ordered, That no person or persons whatsoever, imployed at any time about the bodyes of men, women, or children, for preservation of life or health; as Chirurgions, Midwives, Physitians or others, presume to exercise, or put forth any act contrary to the known approved Rules of Art, in each Mystery and occupation, nor exercise any force, violence or cruelty upon, or towards the body of any, whether young or old, (no not in the most difficult and desperate cases) without the advice and consent of such as are skillfull in the same Art, (if such may be had) or at least of some of the wisest and gravest then present, and consent of the patient or patients if they be *mentis compotes*, much less contrary to such advice and consent; upon such severe punishment as the nature of the fact may deserve, which Law nevertheless, is not intended to discourage any from all lawfull use of their skill, but rather to incourage and direct them in the right use thereof, and inhibit and restreine the presumptuous arrogency of such as through presidence of their own skill, or any other sinister respects, dare boldly attempt to exercise any violence upon or towards the bodyes of young or old, one or other, to the prejudice or hazard of the life or limbe of man, woman or child.

A law which must have added, also, something to the dignity of the physicians was passed about this time 'regulating the precedence of passengers in ferry boats, preference being given to physicians, chirurgeons, and midwives.'

One finds also in looking through early records of the General Court many petitions for families of deceased physicians or for compensation for work done by physicians. Sometimes these petitions were

acted upon favorably by the public authorities, sometimes not.

The practice of medicine was, as we have seen, carried out by ministers as well as physicians and barber-surgeons. The ministers were expert in phlebotomy and they were wont 'to bleed and pray' in all severe cases. The barber-surgeons also used the lancet freely and did the rough work of minor surgery, such as extracting teeth. We have one curious story of an early barber-surgeon in this country, named Dinely who, while going out to Roxbury to pull a tooth, was lost in a very severe snowstorm, December 15, 1638. It was many days before his body was found and his widow suffered great anguish. Her grief hastened the event she was anticipating with so much joy and she named the baby Fathergone Dinely.

The use of the word *physician* or *doctor* came into general use early. It is said that the earliest record of the term *doctor* is to be found in the archives of the Roxbury Church under the date of November 5, 1668. There is also an allusion to 'Dr. Emery of Salem' about the same period. All surgeons except the barber-surgeons were called chirurgeons. Among the more learned, the word *physician* was used somewhat earlier. For instance, in the Harvard College records, Orders of the Overseers, May 6, 1650, we find the following statement: 'No schollar shall take Tobacco unlesse permitted by the President with the Consent of their parents or guardians, and on good reason first given by a physician and then in a sober and private manner.'

Occasional inquests were held, and a few post-

mortem examinations are recorded. It is presumed that a certain amount of anatomical knowledge was thus acquired. In 1676 a post-mortem examination was done which is referred to in the Essex County Court papers at Salem. There is also a still earlier autopsy noted in the Roxbury Church records under the date of August 20, 1674. This appears to be the first post-mortem examination in New England.

There was no definite attempt to teach medicine except through the apprentice system already mentioned. Hippocrates, Galen, and the Arabic School were probably frequently quoted. 'Pathology was mythology,' says Oliver Wendell Holmes, and the pharmacopœia consisted mainly of juniper and similar drugs, such as Gerard described so effectively in his 'Herball,' already noted in the letter to John Winthrop. The student learned by going around with the doctor, picking up the physiology of disease from his master, learning to differentiate fevers, pleurisies, asthma, dropsy, fluxes, smallpox, sore throat, measles, and consumption. He saw what was done for patients, put up the medicines, gathered the herbs, and so learned his materia medica and botany. Surgery was somewhat of a separate specialty, minor surgery being done by the barber-surgeons; obstetrics was in the hands of the midwives.

Oliver Wendell Holmes [1] has given us a brilliant account of what one of Giles Firmin's visits to a patient must have been like. He visualized Firmin and his apprentice, Luke, riding on horseback from house to house. In the first house Firmin finds a case

[1] *Medical Essays.* Boston, 1883.

of simple colic. The student thinks the man may die but Firmin is sure he will recover. ''Tis but a dry belly-ache... he hath not the pulse of them with fevers.... We will steep certain comforting herbs which I will shew thee, and put them in a bag and lay them on his belly. Likewise he shall have my cordial julep with a portion of this confection... which hath juice of poppy in it, and is a great stayer of anguish.' This was simple but effective treatment given after a correct diagnosis; the value of opium was clearly recognized.

The student and physician then pass to another house where they find a young girl dying of tuberculosis. Luke remarks that because she has 'red cheeks and a bright eye' she will soon get well, but wise Firmin points out that 'redness of the cheek is but a sign of fever which, after the Grecians, we do call the hectical; and that shining of the eyes is but a sickly glazing, and they which do every day get better and likewise thinner and weaker shall find that way leading to the churchyard gate.' Thus Firmin, the preacher-physician, instructs his apprentice in a manner not unlike that in which hundreds of scholars were instructed in years to come. This system of apprenticeship lasted well into the nineteenth century.

The charges for physicians' services are seldom recorded in the early literature. Those that are do not seem to be excessive. James Oliver, the great-great-grandfather of Oliver Wendell Holmes, for instance, who graduated from Harvard College in 1680 and died in 1703, left a notebook, begun in 1685, which contains many notes about fees as well as

interesting prescriptions and charges for the same. Oliver practised in Cambridge and used ordinary simples such as elder, parsley, fennel, saffron, snakeroot, and wormwood, with elixirs and cordials. Occasionally more energetic measures were employed, such as iron and mercury. He treated one patient for three months and his charges, including fees for visits as well as charges for medicine, were seven pounds and two shillings.

We have seen the general character of medicine as it was practised up to the year 1700. There must have been too few physicians and one of the pressing needs of the early colonists was for more men trained in medicine. It was necessary, apparently, for the preachers to take over the work of practice, which they did reasonably well. In Savage's 'Genealogical Dictionary,' there are only one hundred and thirty-four medical practitioners noted among the early settlers up to the year 1692. Of these, twelve and probably more, practised surgery. Three were barber-surgeons. Six or seven of the number were ministers as well as physicians and Oliver Wendell Holmes, who examined the lists, thinks there must have been many more not recorded. One is listed as a doctor, a schoolmaster, and a poet; another practised medicine and kept a tavern. One was a female practitioner employed by her own sex.

Two features of American medicine in the colonial period, as pointed out by Dr. F. H. Garrison in his 'History of Medicine,' are especially worthy of note.

In the first place, the half-fledged youth, who studied with some physician under indentures of apprenticeship,

received actual bedside instruction from the start. and, although serving as sweep and stable-boy for his master, was still learning how to bleed and cup, to prepare drugs and apply them. Second, under primitive, frontier conditions, the mediæval antagonism between physician and surgeon soon disappeared, for the necessary and sufficient reason that, while midwifery was in the hands of women, the open-country or back-woods doctor was liable to be called upon in any emergency. Thrown upon his own resources, he soon learned to enlarge such native skill as he had in bone-setting, treatment of arrow and gunshot wounds or reducing hernias and so became a bit of a surgeon.

Many of these apprentices proved to be skilful physicians, some even more so than their fortunate colleagues who boasted of a foreign medical degree. From this period onward, 'American medicine acquired that eminently practical tendency which has been its chief merit and of which we have no reason whatever to feel ashamed. That the profession soon developed a certain *esprit de corps* (backed up by strong public sentiment) is evident in that we find no records of strolling lithotomists, cataract-couchers, or other quacks in this period; that the names of no New England physicians are connected with the scandal of Salem witchcraft; and that we find records of the latter giving service to the sick poor for the remittance of taxes.'

The witchcraft tragedy of 1692 seems not to have affected medical practice, nor can we find that any physicians were connected with it. It must be remembered that this outbreak was not an isolated tragedy but was a mere transitory episode in a perfectly under-

[1] Garrison, F. H.: *History of Medicine*, 4th ed. 1929.

standable superstition. Witchcraft at the time was the universal human belief. 'The most remarkable thing about the New England persecutions was not the tragedy itself but the rapid return of the community to its habitual sensible frame of mind, and the frank public confession of error made by many of those who had been implicated, features which are without parallel elsewhere in the long history of witchcraft.'[1]

We have thus seen that the development of medicine in Massachusetts was making slow but steady steps during the seventeenth century. The bond between the clerical profession and the doctors, existing since the earliest days of colonial life, was being severed and there was no longer any practical connection between them. 'Medicine,' says Green,[2] 'had passed through the creeping stage and was now beginning to walk.' Some physicians began to turn their attention towards special types of general practice and, as we shall see later, physicians became interested in single diseases, such as smallpox and inoculations for that disease to the exclusion of their other work. Opportunities for specialization, however, were few. There was neither medical school nor hospital, and the apprentice system was still in vogue at the end of the century. The general practitioner educated by this system, and usually without a degree, did the practical work of the time. The few physicians who sought their medical degrees in Europe do not seem to have been outstanding in the community.

[1] Kittredge, G. L.: *Witchcraft in Old and New England.* 1929.

[2] Green, S. A.: *History of Medicine in Massachusetts.* 1881.

CHAPTER III

THE EIGHTEENTH CENTURY TO THE AMERICAN REVOLUTION

1700–1775

MEDICINE in Massachusetts in the eighteenth century, up to the time of the American Revolution, is characterized by a number of distinct features: epidemics of smallpox repeatedly ravished the colony with great loss of life; the disease was partly subdued by direct inoculation, a practice first introduced into this country by Zabdiel Boylston in 1721; quarantine of the port of Boston was more strictly enforced than during the previous century; a quarantine hospital was established on an island in Boston Harbor and new quarantine laws were inaugurated; the tone of medical practice was greatly improved; a medical society, of short duration, to be sure, was started; sporadic medical literature appeared; an apothecary shop came into being; medicine divorced itself from the influence of the ministers; four physicians of considerable ability practised in Boston: Zabdiel Boylston, William Douglass, Silvester Gardiner, and James Lloyd; and, during the period from 1740 to 1760, the following members of the medical profession, all of whom were to influence medicine in Massachusetts, were born: Joseph Warren (1741), Benjamin Shattuck (1742), William Aspinwall (1743), Isaac Rand (1743), John Jeffries (1745), Aaron Dexter (1750), John Warren (1753), Benjamin Waterhouse (1754), and Josiah Bartlett (1759).

In 1700 the quarantine laws, established by the General Court in 1647–49 and 1665, put to a hard test by the entrance of yellow fever in 1693, were still in force. At irregular intervals after this time they were modified and added to. A hospital was needed and, in 1716, the General Court took steps to establish one. It was built the next year on Spectacle Island, in the harbor, but transferred, in 1737, to Rainsford Island, where it remained for over one hundred years. Other islands in the harbor were used, later, for special inoculation hospitals for smallpox, the first one opened in 1764. Quarantine seems to have been reasonably efficient during the century for we hear little of plague or yellow fever from 1700 on. The outstanding epidemic disease of the period was smallpox, which was ever present and terrifying in its destructiveness.

The century both opens and closes with smallpox and, although control was partly established by laws and by the inoculation practices of Boylston, it was not until 1800, when Benjamin Waterhouse introduced Jennerian vaccination, that there was any marked decrease in the death rate. A smallpox prevention act was established in 1701 authorizing impressment of houses for isolation of patients. The act was helpful but smallpox raged the next year in Boston and continued sporadically up to the epidemic of 1721–22, the time of Boylston's first inoculations. His work, the first outstanding medical advance in this country, deserves special mention.

Zabdiel Boylston was the grandson of Thomas Boylston, Esq., who, at the age of twenty, came to this country (1635) and settled in Watertown. His

father, also Thomas Boylston, was born in 1644, married Mary Gardner of Muddy River, then in Boston but set off in 1705 as a part of the town of Brookline. Thomas Boylston became a physician and surgeon, the earliest of the Muddy River district, although where he received his medical degree, if he ever obtained one, is unknown. He was married thirty years, and had twelve children, the sixth being Zabdiel. This boy, taught by his father and without a medical degree, became the most meritorious physician of his day in America.

Boylston was born in 1679 and died in 1766, at the age of eighty-seven. Educated in medicine by his father and Dr. Cutter, a physician of some note in Boston, he attracted no special attention until 1721. He was then living in Dock Square, not far from the residence of the Reverend Benjamin Colman, pastor of the Brattle Street Church, whose house faced the Doctor's yard, and from which Colman was able to observe the behavior of the Doctor's patients. At that time there were fourteen apothecary shops in Boston and every practitioner dispensed his own medicine. Boylston indeed was called 'an apothecary' by an anonymous writer not well disposed to him. His practice was also surgical, and he is spoken of as 'a cutter for the stone.'

Towards the end of April, 1721, Boston was invaded for the sixth time with smallpox. At the close of the epidemic, in 1722, the population of the town was 10,567; 5989 persons had had the smallpox, of whom 894 died, a ratio of about one in seven. Of the previous epidemics, that of 1678 had been especially

fatal and that of 1701–02 was of recent memory to many of the inhabitants. Since 1702 the population had doubled and many unprotected children had been born.

The news came from the Barbados in April, 1721, that twenty or thirty deaths from smallpox had taken place there. A fleet arrived, bringing the disease to Boston, and on the 15th of April, Sewall writes in his 'Diary,' that a council was held in regard to giving liberty to certain of the ships to come into the harbor. On the 8th of May, a Negro servant, sick with smallpox, was the first definitely to be infected. By the 12th of May one of the boats, the Seahorse, contained many cases; there were only ten or fifteen effective men on board. Infection soon appeared in the town, and by May 27 eight cases of the disease were reported. The epidemic increased in severity and raged throughout the autumn and winter until the following January. The disease spread into the neighboring towns, especially Roxbury, Charlestown, and Cambridge. From Charlestown it is reported that there were not more than ten or twelve families which did not suffer.

There were ten physicians in Boston at the time, three of them liberally educated, two being graduates of Harvard College. One was the surgeon from an English warship, one a Frenchman who had served in foreign wars. The leading physician of the town was probably William Douglass (1691–1752), a Scotchman of about thirty years of age, who had been in Boston some three years and who had brought letters of recommendation to the Reverend Increase and the Rev-

erend Cotton Mather and to the Reverend Benjamin Colman. He received his education in Edinburgh, Paris, and Leyden, and was the only physician in the town at the time who had received the degree of M.D. Well read, a versatile writer, and a man of intelligence and ability, Douglass was, nevertheless, conceited, injudicious, inaccurate, and contentious. He had a taste for natural history, was an excellent botanist, studied his medical cases and took careful notes by the bedside. In the earlier part of his career he soon attained an influential position among his fellows. At first he was favored by the Mathers and Colman but he later lost their esteem when he became a bitter and violent opponent of their views.

Early in the epidemic he lent Cotton Mather a volume from the 'Philosophical Transactions of the Royal Society' (Vol. XXIX). In it were a number of letters from Cotton Mather himself on other subjects. Two papers by Timonius and Pylarinius, however, which gave definite statements of the method and successful results of the treatment of smallpox in Turkey and neighboring countries by inoculating healthy individuals with the disease, were in the volume. Cotton Mather was quick to see the bearing of these articles on existing conditions. On May 26, 1721, he made a note in his diary: 'The grievous calamity of the smallpox has now entered the town. The practice of conveying and suffering the smallpox by inoculation has never been used in America, nor indeed in our nation, but how many lives might be saved by it if it were practiced. I will procure a consult of physicians and lay the matter before them.' He therefore prepared a

letter to the physicians of Boston giving an abstract of these communications. This letter was the beginning of the battle which raged so violently for many days to come.

The reports which Cotton Mather's quick eye had seen in the 'Philosophical Transactions' were the results of observations in Constantinople only a few years before 1721. The practice of inoculation, however, was much older. Records are found of it in the seventeenth century, about the year 1670–71. None of these primitive variolations, however, served to acquaint England with the practice. It was only after inoculation had reached a certain development in Constantinople that it began to be studied and recommended. From this city, Lady Mary Wortley Montagu, wife of the British Ambassador, wrote to her friends at home about the method as practised and expressed her intention of introducing it to England. She even had her three-year-old son inoculated by a Greek woman in 1718, and arranged for inoculations of three other children in the family of the secretary of the French embassy. Her inspiration, and these examples, undoubtedly opened the doors for the introduction of the practice in England.

There was already, however, some medical agitation on the subject before Lady Mary became interested and it can safely be presumed that she was not ignorant of it. Timonius, a Greek physician of Constantinople, who had been educated at Oxford, published an account of the method in 1714, at the same time sending a communication to England which was read before the Royal Society. There were prob-

ably one or two men in England also who had some personal knowledge of the method, having seen it practised in Constantinople. Another dissertation on inoculation first published in Venice in 1716, by Pylarinius, appeared with others in Volume XXIX of the 'Philosophical Transactions.' In 1721, when smallpox was raging on both sides of the Atlantic, it is not strange that Boston and the keen-eyed Mather should have become interested in these reports.

Cotton Mather's letter, written June 6, 1721, an 'Address to the physicians of Boston,' exhorted them to inoculate. The open letter was based on the papers of Timonius and Pylarinius. In addition, Mather had a slave, Onesimus, who had been inoculated in Africa, who said that it was common among the tribes there so to protect themselves. The advice of the minister, apparently, was not taken very kindly by the Boston physicians; on June 24, Cotton Mather wrote another letter, this time to Zabdiel Boylston. It begins by saying, 'You are many ways endeared to me, but by nothing more than the very much good which a gracious God employs you and honors you to do to a miserable world.' He goes on to say that he wishes to lay before him all that he knows concerning the matter, and if upon mature deliberation 'you should think it advisiable [*sic*] to be proceeded in, it may save many lives that we set a great value on. But, if it be not approved of, still you have the pleasure of knowing exactly what is done in other places.' Mather does not seem to be extreme in this letter, but merely suggests the possibility of inoculation to Boylston, leaving the way open to him to refuse it. Boylston at

the time was forty-two years of age, a practitioner in Boston; Mather, a venerable churchman of fifty-eight, minister of the Second Church, had lost none of his prestige.

The letter had a very decisive effect on Boylston's conduct, however, and he undertook to experiment with inoculation within two days, June 26, 1721. He could not inoculate himself because he had suffered with smallpox in 1702, but he was so convinced of the merits of the procedure that he inoculated his son Thomas, six years of age, and two of his Negro slaves, one thirty-six, and the other two and a half years old. Inoculation was not without hazard to the lives of those who promoted it. Boylston's family was hardly safe in his house, and he often met with affronts and insults in the street. Many pious and sober people thought that if any of his patients should die, he should be treated as a murderer. It is reported, although not confirmed, that parties with halters threatened to hang him to the nearest tree, and he was obliged to remain secreted for fourteen days.

In July, Boylston made a public statement in the newspaper saying that he had patiently borne the clamor and that he was not fearful of the rage of the people. He continued to inoculate, his next patient being his son John, thirteen years of age, on the 17th of July, and seven others were treated the next day.

There were various letters published within a few weeks by Increase and Cotton Mather and others justifying the procedure. Boylston was called before the authorities many times, and evidence was shown before the selectmen that many patients had died of

inoculation. The evidence presented was so strong that the selectmen accepted the view and forbade further inoculation, but Boylston persisted, 'in contempt of the magistrates and in contradiction to the practitioners.' Most of the people thought the disease would actually be spread by inoculation, and Cotton Mather stated in his 'Diary': 'They rave, rail, they blaspheme; they talk not only like idiots but also like fanatics and not only the physician who began the experiment but I am also an object of their fury; their furious obloquies and invectives.' Again, a few days later, he writes: 'The cursed clamor of a people strangely and fiercely possessed by the devil will probably prevent my saving the lives of my two children from smallpox in the way of transplantation.'

The opponents of inoculation used the newspaper, the 'New England Courant,' published and sold by James Franklin, as a means of spreading their ideas. Despite the opposition of Douglass and most, if not all, of the practitioners and of the town authorities, inoculation was continued. Two physicians, of whom we know only the names, Lawrence Dalhonde and Joseph Marion, were associated with Douglass in his opposition to Boylston. Dalhonde made a deposition (written in French) stating that his previous experience had not given him a favorable impression of smallpox inoculation. The paper, translated by Douglass and Marion, was published July 22, 1721. Boylston was supported in his action by the leading clergymen of the town, who wrote articles and pamphlets in its favor. One, a joint paper by Boylston and Mather, was prepared in their own defence. It

appeared about September 1, 1721, in three parts; Parts I and III were the work of Mather, Part II chiefly by Boylston. Some ministers underwent inoculation themselves and advised their parishioners to do so. Boston continued to be much stirred by the number of cases of smallpox, but, as the epidemic increased in severity, so did the number of those inoculated. The better educated and the more intelligent were in favor of the method, although the people at large were in violent opposition. By October, 1721, there had been definite progress, and a report was issued showing that of more than threescore persons who had been inoculated, only one had died, apparently of some other disease.

There was a certain amount of indirect legislation against the practice. For instance, on November 4, 1721, it was voted that all those persons affected with smallpox, or others coming to Boston to be inoculated should be sent to the quarantine hospital on Spectacle Island.

On November 9, Cotton Mather took his nephew from Roxbury, Mr. Walter, into his house for the purpose of being inoculated. This excited the people and, while the patient was lying in his room, November 14, a lighted grenade, intended for his host, was thrown through the window, but the fuse became detached and burned itself out. The episode was probably a protest against inoculation, although there is some evidence that it was against Cotton Mather himself for more specific and personal reasons.

The report of progress, mentioned above, was followed in the course of a month by another report by

the Reverend Benjamin Colman, praising the method. When smallpox appeared in Cambridge, Boylston inoculated a number of the students and some of the instructors.

Boylston probably inoculated about 240 patients, and other doctors inoculated a few more. Of the 280 known inoculations, only six persons died, in contrast to those who were attacked by the disease through New England, outside of Boston, where the death rate was twelve to fifteen per cent. The epidemic gradually came to an end and Boylston's efforts received recognition.

The progress of the epidemic and of inoculation in Boston had been closely followed in England, where there was much interest in the subject. Shortly after this, Zabdiel Boylston spent a year in London. He was then the inoculator with the largest individual experience in the civilized world, although his publications on the subject had been few. It seems quite likely that he was invited to England in order to report his experiences. He lectured before the Royal College of Physicians and the Royal Society at the instigation of Sir Hans Sloane. He was elected a fellow of the Royal Society in July, 1726. It does not appear that he did any inoculating while in England.

His book, 'An Historical Account of the Smallpox Inoculated in New England,' was published in London in 1726. A reprint appeared in Boston in 1730. 'Boylston's historical account showed that he kept careful records of everything he did. The results are logically set forth and clearly tabulated, and the

work is in every way a masterly clinical presentation, the first of its kind from an American physician.' [1]

An interesting note on Boylston is contained in an account of the visit, many years later, in Paris (1783), of Ward Nicholas Boylston, Boylston's grandnephew, to Benjamin Franklin. Franklin stated that: 'When Dr. Boylston was in England, I was there reduced to the greatest distress, a youth without money, friends, or counsel. I applied in my extreme distress to him who supplied me with twenty guineas and relying on his judgment, I visited him as opportunities offered and by his fatherly counsels and encouragements I was saved from the abyss of destruction which awaited me and my future fortune was based upon his parental advice and timely assistance.'

Boylston returned to Boston in October, 1726, and resumed his practice. He now had overcome all opposition and his practice was large, much greater than that of his former rival, Douglass. There was a distinct change, also, in the attitude of the Town Council, for on March 10, 1729, they advised inoculation during an epidemic and also asked the physicians of Boston to notify them in regard to the number inoculated, and how each patient progressed. The physicians who had originally opposed inoculation gradually adopted it; even Douglass regarded it as 'a considerable improvement in physic.' In the late years of his life, Douglass became an even more earnest advocate of the practice.

There was not another epidemic in Boston until

[1] Fulton, J. F.: 'Zabdiel Boylston,' in *Dictionary of American Biography*. 1929.

1752, when a ship came in from London infected with smallpox. The disease appeared in January, and by March it had spread rapidly. The town, with about 15,000 inhabitants, had 5500 cases of smallpox; 2000 people were inoculated by the Boylston method. The mortality among those not inoculated was one in ten or eleven, while of those inoculated, only one in sixty-eight died.

Boylston retired from his comfortable practice soon after this epidemic was over, to live on the splendid estate built by his father in Brookline. He died March 1, 1766, and was buried in the old cemetery in Brookline.

Boylston's chief opponent in the inoculation controversy, William Douglass, as we have seen, was only slowly convinced of the value of this procedure. It was not until thirty years had passed that he completely accepted it. In 1751, he finally wrote in his book, 'A Summary, historical and political, etc.,' that 'the novel Practice of Procuring Smallpox by Inoculation, is a very considerable and most beneficial improvement in the Article of medical Practice.' In the meantime, however, he had been busy with other things, and as the leading physician in Boston he was active in establishing a medical society and in describing an epidemic of scarlet fever which occurred in 1735 and 1736.

The organization of a medical society, in 1735, is of considerable interest because it was the predecessor of the Massachusetts Medical Society, established in 1781. We have no definite notes in regard to it, except in letters of the time. A letter written by Doug-

lass, under the date of February 18, 1736, to Cadwallader Colden, the Scotch scientist of New York, stated:

... We have lately in Boston formed a medical society, of which, this gentleman (Dr. Clark, the bearer of the letter), a member thereof, can give you a particular account. We design from time to time to publish some short pieces; there is now ready for the press number one with this title-page:

Number One,

MEDICAL MEMOIRS

containing

1. A miscellany. Practical introduction.
2. A history of the dysentery epidemical in Boston in 1734.
3. Some account of a gutta-serena in a young woman.
4. The anatomical inspection of a spina ventosa in the vertebræ of the loins in a young man.
5. Some practical comments or remarks on the writings of Dr. Thomas Sydenham.

Published by a Medical-Society in Boston, New England.

Unfortunately, this first number of the 'Medical Memoirs' of the 'Medical-Society in Boston' was not published. The Clark referred to was presumably John Clark, the fourth in line of that family of physicians already noted. The medical society lasted from 1736 to 1741, and perhaps longer; ten years after this date there was no trace of it. Douglass's book on scarlet fever, to be noted later, published in 1736, was inscribed 'To a Medical Society in Boston,' and in the dedication he speaks of having the pleasure of being one of the members of this society. In 1737,

also, in the January 5th number of 'The Boston Weekly News-Letter' there is a letter addressed 'To the Judicious and Learned President and Members of the *Medical-Society in Boston.*' The letter favors the regulating of the practice of physic throughout the province and advocates the plan of having all practitioners examined by a board of physicians and surgeons appointed by the General Court. The author severely condemns '*Shoemakers*, *Weavers* and *Almanack-makers*, with their virtuous Consorts, who have laid aside the proper Business of their Lives, to turn Quacks.' The last record of this short-lived medical society appeared in the same 'News-Letter,' November 13, 1741, as a report of a surgical operation performed about that time for urinary calculus. The operation was done, 'in the Presence of the Medical Society,' by Silvester Gardiner and 'according to Mr. Cheselden's late Improvement of the lateral Way.' We may diverge here a moment to speak of Silvester Gardiner, who, with William Douglass and Zabdiel Boylston, formed the three important physicians of the first half of the eighteenth century in Boston.

Silvester Gardiner, born in Rhode Island in 1708, was educated privately in Boston by his brother-in-law, the Reverend James MacSparran, and later went to London, where he was trained by William Cheselden, the surgeon. After further study in Paris, where he was shocked by the licentiousness of the city, he returned to Boston about 1735, married the daughter of a wealthy physician, and was soon involved in an extensive and lucrative practice. He was, we presume, one of the early members of the 'Medical-

Society in Boston.' Later, in 1744, he established the first apothecary shop in Boston, at the 'Sign of the Unicorn and Mortar,' which proved so profitable that he opened similar shops in Connecticut. We have seen, in the note in regard to the 'Medical-Society in Boston,' that in 1741 he successfully removed a kidney stone, using the Cheselden operation. Gardiner built a large house in Boston and entertained lavishly many of the important personalities of his time. Later he became an ardent loyalist and retired to Halifax with the British at the time of the evacuation of Boston. Gardiner and Douglass, both having been trained in England, were the first physicians in New England to exert a marked English influence on American medicine. They were followed shortly by James Lloyd, who did even more to Anglicize medicine in New England.

Zabdiel Boylston, in the meantime, seems to have retired rather quietly from medical activities and we hear little of him in relation to the formation of the medical society or the part he may have played in the epidemic of scarlet fever so adequately described by Douglass.

Scarlet fever appeared in Boston and its vicinity in 1735. According to the description given by Douglass in his book published in Boston the next year, 'The Practical History of a New Epidemical Eruptive Miliary Fever, with an Angina Ulcusculosa which prevailed in Boston New England in the Years 1735 and 1736,' the disease began in Kingston, about fifty miles from Boston, in May, and spread gradually, reaching Boston in August, although many cases were

not reported until November. The death rate in Boston was about one in thirty-five; in Kingston it was much heavier, one in three to six. Douglass estimates that about four thousand persons, or one quarter of the inhabitants of Boston, had the disease, and over one hundred died. He personally cared for a large number of the patients and is said to have seen most of the 'difficult' and 'extraordinary' cases among the four thousand. Douglass describes fully the eruption and the desquamation, speaks of the greater susceptibility of children and young persons, describes the typical onset, the usual sore throat and joint pains, pictures the fulminating type which terminates fatally on the first, second, or third day, the septic type with ulcerative lesions in the throat and cellulitis of the neck with necrosis, and describes in detail other manifestations, such as anasarca, hemorrhagic diathesis, peritonsillar abscess, and mental disturbances. This accurate clinical observation of the epidemic reveals Douglass as an unusually acute clinical observer. In his concluding paragraph he says that his notes were 'taken clinically from the life and not copied.' Too much credit cannot be given to Douglass for his extraordinary delineation of the disease, published by him some twelve years before the so-called 'classical' description by John Fothergill, the English physician. In later years the disease has been considered by some as diphtheria, but we agree with Weaver,[1] that 'it seems impossible that any doubt could arise regarding the identity

[1] Weaver, George H.: *Life and Writings of William Douglass, M.D.*, 1691–1752. *Bull. Soc. Med. Hist.*, Chicago, 1921, II, 229.

in the mind of any one who had read Douglass's description and is familiar with the disease,' for the description corresponds in every detail with what has been known for many years as scarlet fever.

Douglass must rightly be considered as the leading physician of Boston in 1750, in spite of the important work of Zabdiel Boylston fifteen years before. He evidently stood well with other physicians, for he was allowed by them to visit and study their unusual cases, and he held autopsies at which other practitioners were present. His position as a leader of the time is also well shown in the completeness with which the physicians followed him in opposing inoculation for smallpox. As we have seen, he was active in forming the first medical society in Boston, and Weaver thinks he became a teacher 'of the less favored members of the profession.' Douglass had many scientific interests outside of medicine, and wrote letters to Cadwallader Colden, of New York, in regard to eclipses, earthquakes, and maps. He travelled through the four colonies of Massachusetts Bay, Connecticut, Rhode Island, and New Hampshire, and commenced a map of New England based on actual surveys; at the time of his death, the map was not finished. He was interested, also, in botany, a study which he had begun in Europe, and he made a collection of over one thousand American plants, seven hundred of them gathered together during the first three years of his stay in Boston. In 1743 he published an almanac.

Douglass must have been a successful practitioner of medicine, as he bought extensive lands in Worces-

ter County from 1723 to 1741. He also acquired considerable real estate in Boston. The township of Douglass, Massachusetts, was named after him in 1746, and he gave a sum of money to the township for the establishment and maintenance of a free school. During his entire residence in Boston he was connected with the Scotch Charitable Society, and he was president from 1728 until his death. Outside of medicine, his most important work was the publication of Volumes I and II, in 1749 and 1751, of 'A Summary, Historical and Political, of the First Planting, Progress and Progressive Improvements and Present State of the British Settlements in North America.' These volumes were published in Boston, reprinted in Boston and London, 1755, and in London, 1760. This historical work was evidently written at odd times stolen from his profession, with the purpose of preserving data which might be useful at future times. Douglass collected a great mass of information on a wide range of subjects. The book has been severely criticized because of the numerous errors in it. He was a man of strong prejudices, always inclined to take one side of any question and unable to see the other, and his book shows the evidence of this point of view. The history, however, is of considerable value in spite of its well-marked deficiencies. Douglass also wrote a number of papers on economics, especially in relation to the currencies used at the time. It is said that his book on the subject, published in 1739 in London and in 1740 in Boston, was 'the very best of the eighteenth century descriptions of money questions. Douglass had a firm grasp of fundamental facts

and principles, although he did not develop a complete theory of money.' [1]

A few years after the time of Douglass's work and that of Gardiner, a new figure of importance to medicine appeared in Boston in James Lloyd, who, born in 1728, lived throughout the eighteenth century and into the first decade of the next. He was born on his father's extensive estate on Long Island, New York. After preliminary education in Connecticut, he was apprenticed for five years to William Clark, one of the leading practitioners of Boston. He went to England, where he studied, as had Gardiner before him, with William Cheselden, the surgeon, then at the height of his career. Lloyd also acted as a 'dresser' at Guy's Hospital and attended the lectures on midwifery of William Smellie. He met both William and John Hunter and may even have listened to some lectures of William Hunter. John Hunter, exactly Lloyd's age, had been in London only two years; Lloyd kept up a correspondence with him until Hunter died in 1793. Through Lloyd, American medicine received its strong English influence which we have already noted as having been begun by Douglass and Gardiner.

Lloyd arrived in Boston from London in 1752, the year that Douglass died. Gardiner was still alive and, with Douglass no longer a rival, was the outstanding practitioner of the town. The 'Medical-Society in Boston' had died out ten years before. Gardiner's apothecary shop was the important drug-store in Boston, although others had sprung up in imitation

[1] Bullock, Charles J.: 1897 edition of Douglass's *A Discourse Concerning the Currencies of the British Plantations in America, etc.*

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of it by the middle of the century. Boylston had retired to Brookline and was not very active in practice, although he did not die until 1766. Two members of the Clark family were practising in Boston. The fourth in the line of Clarks was an oldish man, while the fifth was at the height of his career. Lloyd apparently began to practise obstetrics almost at once, the first physician in this country to do midwifery upon a scientific basis; prior to this time, childbirth had been entirely in the hands of the midwives. Lloyd, of course, had learned the art of obstetrics from his teacher, Smellie, of London. He also brought back with him the later teachings of Cheselden, and it must have pleased Gardiner, who had returned from London fifteen years before, to think that the great man in surgery was still teaching a Boston physician. Lloyd's practice apparently grew rapidly and he took the place formerly occupied by Douglass. Socially inclined, he built a handsome house in the centre of fashionable Boston. His garden was noted, for he was something of a practical as well as a scientific horticulturalist; he was fond of sports; he numbered among his intimate friends, as well as patients, General Howe and Lord Percy. Before the American Revolution, also, he had taken Gardiner's place as the leading physician of Boston. He began to take pupils into his house, and it is interesting to note, at this point, how many young men lived with him who later became well-known physicians. The most important name is that of Joseph Warren, but he also taught Isaac Rand, Jr., John Jeffries, Theodore Parsons, and the sixth John Clark. All of these young men were

graduates of Harvard College and, later, some of them took an active part in the American Revolution.

Lloyd's only contemporary of importance was Edward Augustus Holyoke, born in the same year (1728). He was the son of a minister of Marblehead who had been graduated by Harvard College in 1705 and was president of the College from 1737 to 1769. Holyoke was the eldest son and the second of eight children. He received his education in Cambridge and was graduated by Harvard College in 1746. His apprenticeship was served in Ipswich with a Dr. Berry, with whom he remained for two years, later settling in Salem in 1749. Holyoke passed the rest of his life there in the practice of medicine, living for over one hundred years, to die in 1829. Although he had contacts with Boston and later became the first president of the Massachusetts Medical Society, the journey in those days from Salem was an arduous one and Holyoke could be in no way considered as a rival in practice of James Lloyd. He did, however, take pupils and, as we shall see, the younger brother of Joseph Warren, John Warren, was trained in his household.

The principal disease of the century, up to the time of the American Revolution and even after it, with which Boylston, Gardiner, Douglass, and Lloyd had to combat was, of course, smallpox, except for the epidemic of scarlet fever in 1735 and 1736 described by Douglass. In 1761, Gardiner made a proposition to the town of Boston to build at his own expense an inoculation hospital, although the offer does not seem to have been accepted. The first hospitals actually

established were those at Point Shirley and Castle William, both opened in the winter of 1764, during an epidemic of smallpox. The Point Shirley hospital was established by the Governor of the Province and placed under the charge of several physicians. A resident physician, William Barnett, came from Elizabethtown, New Jersey. All patients to be inoculated were sent to one or the other of these hospitals, and the physicians of Boston agreed not to inoculate outside of them. Accommodations were provided at each hospital for people of moderate means as well as for the wealthy. At Castle William, Samuel Gelston and Joseph Warren were in residence, and Lloyd, Nathaniel Perkins, and Whitworth supervised the inoculations. In the barracks there were forty-eight rooms, each accommodating ten patients. The hospital was open, by February 27, 1764, to all physicians. Gelston had come from Nantucket, where he had previously managed a smallpox hospital at Martha's Vineyard and had successfully inoculated eighty-one people. In addition to these hospitals at Point Shirley and Castle William, there were a few private establishments in Boston. People came from all the provinces and even from other colonies to be treated at these two important hospitals, and it is said that during the first five weeks after they were opened, more than three thousand persons received the disease; there was not a fatal case among them.

It was during this same winter that the library of Harvard College was burned on the night of January 24, 1764. The conflagration is interesting, from the medical point of view, on account of the fact that this

library contained a number of medical books, some 'anatomical cutts and two compleat skeletons of different sexes.' 'The Boston Post-Boy and Advertiser' of January 30 notes that 'this Collection would have been very serviceable to a Professor of Physic and Anatomy, when the revenues of the College should have been sufficient to subsist a gentleman in this character.' It would seem that, even in 1764, some ideas of organized medical instruction were present, and it is even likely that physicians had made a demand upon Harvard College for such instruction; this, over one hundred years since Giles Firmin taught anatomy in New England!

After the smallpox epidemic of 1764–65 had died down, there was not so much demand for inoculation hospitals, although those on the islands in Boston Harbor were kept open. Another epidemic, however, was soon to follow, and in 1773 it was considered advisable to open still another hospital, this time on Cat Island, near Marblehead. It was known as the Essex Hospital and had accommodations for eighty patients. The hospital was not under Government supervision, but was under private management. There was considerable feeling against it on the part of the inhabitants and it was burned the next year by some ruffians; popular feeling was with them and it was impossible to bring them to justice.

At the beginning of the century the treatment of smallpox was based upon the attempt to isolate the patient completely from all outside influences. Thacher [1] states that 'the sick were warmly covered

[1] Thacher, James: *American Medical Biography.* 1828.

in bed, heating and stimulating medicines were freely administered with a view to keeping out the eruption and permitting a profuse perspiration; and some there were who would not permit the linen of the sick to be changed during the whole course of the disease, however copiously the bodily filth might have accumulated.' About 1766 this régime was changed, largely due to the influence of Thomas Sydenham, the English physician, for it had been noted that by exposing patients to the cold air, allowing them to drink cold water, and administering mercurial purgatives, the patients recovered more rapidly. The use of mercury and antimony in this disease was introduced by Benjamin Gale, of Connecticut, about 1750. These drugs, often overused, gradually lost favor and by the time the inoculation hospitals were well established we hear little of them. Smallpox continued from time to time and a fairly severe epidemic occurred in Boston at the time of the evacuation by the British in March, 1776, when the whole population were inoculated.

The Revolution did not appear unexpectedly; medical Boston and New England had already taken sides some years before 1775. From 1765 to 1775, as we have noted before, the outstanding practitioners were James Lloyd and Silvester Gardiner. Both of these men were naturally strong loyalists, as their practice was among the leading British citizens. Lloyd probably had the largest practice and certainly was used more as a consultant than any other physician. He, too, in his great house, was an outstanding figure in Boston social life. His pupils were the best

young men studying medicine of the time, all of them graduates from Harvard College. Silvester Gardiner, on the other hand, was not quite so much of a physician as he was a business man. He had established his apothecary shops, which brought him in a splendid income, and had, also, invested in real estate, especially in timberland in the province of Maine. Although an energetic and public-spirited man, we do not get the impression that he was quite so much of a physician as was Lloyd. When the Revolution finally came, these two physicians separated. Lloyd, in spite of his loyalist tendencies, remained in Boston and is said to be the first citizen to have welcomed at his home General Israel Putnam when the American troops came into Boston. Silvester Gardiner, on the other hand, went to Halifax with the other loyalists. Much of his property, including his house and drug-store, was destroyed, and he lost a good deal of his timberland in Maine.

In addition to Lloyd and Gardiner, the prominent physicians in Boston, in the period just before the Revolution, were James Pecker, later to become one of the founders of the Massachusetts Medical Society in 1781; Samuel Danforth, another founder of the Massachusetts Medical Society; Benjamin Church, of whom we shall hear more later in the period of the American Revolution; Joseph Gardner, Thomas Bulfinch, and Ammi Cutter. Pecker and Danforth with Lloyd and Gardiner were the outstanding loyalists; Joseph Gardner and Benjamin Church became ardent patriots. Outside of Boston there was Simon Tufts, Jr., in Medford, and his brother, Cotton Tufts, in

Weymouth, Edward Augustus Holyoke in Salem, and John Sprague in Dedham.

James Pecker was graduated by Harvard College in 1743. He settled in Boston to practise and was a close friend of both Lloyd and Gardiner. In the smallpox epidemic of 1764, at the time when the Government hospital was established at Point Shirley, he entered into an agreement with Lloyd, Sprague, Gardiner, Benjamin Church, Joseph Warren, and eighteen other physicians, not to do private inoculations. As his practice was largely amongst the better class of patients, it is not surprising that he became a loyalist and felt, like many other physicians of his time, that the onset of the American Revolution was at least premature if not entirely unwise.

Joseph Gardner, forty-eight years of age at the time of the beginning of the American Revolution, was in practice in Boston and a close friend of Joseph Warren and Thomas Bulfinch. These three physicians had arranged to start a private hospital for smallpox inoculation in 1763, before the Government hospital was established the next year, but the hospital was never established. Gardner is said to have had a large practice among the well-to-do, as well as the poor; we find, in 1767, a petition to the General Court to reimburse him for fees for attending the poor. Among his students were John Homans, Joseph Whipple, and Charles Jarvis. He, perhaps inspired by Joseph Warren, became an ardent patriot.

Benjamin Church, having been graduated by Harvard College in 1754, went to London to study medicine. He returned to Boston to practise as both

a physician and a surgeon. Early in his career he became an ardent patriot and gave the 'Boston Massacre' oration, March 5, 1773. When hostilities broke out, he became the first medical director of the new army, having previously served in the Provincial Congress in 1774.

Samuel Danforth, graduated by Harvard College in 1758, studied with Isaac Rand, Sr., and began practice in Boston a few years before the Revolution. He was on the side of the loyalists and had great difficulties after the outbreak of hostilities; his family had to flee and he was treated harshly by the inhabitants.

In general, physicians of the time held a high place in society, probably even higher than they do to-day. Men like James Lloyd and Silvester Gardiner were considered not only the leading physicians of the time but also men of outstanding culture. It was more or less an age of individualism; every physician stood somewhat on his own pedestal and there was little rivalry amongst doctors as we know the word to-day. Physicians had their own patients and family groups and often had their own secret or semi-secret remedies. The leading doctors had pupils resident in their homes, to whom they passed on their knowledge and ideas. These men became particularly loyal to the older physicians, and during the stress of the American Revolution, the pupils usually followed the footsteps of their teacher. Doctors of the time had a certain amount of leisure during which time they could cultivate their minds along other lines than medicine. Douglass was perhaps the outstanding

example of this type of physician, for he was a botanist, something of an astronomer, an economist, and a historian, as well as a physician. James Lloyd was interested, also, in botany and had a large garden connected with his house.

New England physicians, moreover, seem to have avoided certain of the undesirable characteristics noted in their brothers abroad, especially in England. Although men like Lloyd dressed well and drove in their coaches to see their patients, we doubt if they affected quite the style so common in England and France at the time. In England, for instance, the fashionable physician of the middle eighteenth century wore a powdered wig, a handsome coat of red satin or brocade, short breeches, stockings and buckled shoes, a three-cornered hat, and bore a gold-headed cane. The physicians of Paris were even more elaborately dressed, the Dean of the Paris Faculty wearing a long curled wig, an ermine cape, and lace-ruffled sleeves.

We, too, miss in eighteenth-century Boston the quackery which was so rampant in England and Europe. There was no 'Temple of Health' in Boston such as was opened in London in 1780, where electricity, animal magnetism, and 'celestial beds' for rejuvenating senility, were exploited by James Graham. Missing, too, were the out-and-out quacks, such as the 'Whitworth doctors' of England, two village farriers who treated human patients in large numbers. This sort of quackery perhaps was at its height with the revival of the old method of curing disease by touch or stroking, a variant of the faith

cure. We have only one definite instance of such quackery in this country, and that late in the eighteenth century, after the American Revolution, when a clever Yankee, named Elisha Perkins, of Connecticut, sold metallic or magnetic tractors, compass-like contraptions with one point rounded and one sharp-pointed arm, made of combinations of copper, zinc, gold, iron, silver, and platinum. Cures were effected by stroking and their principal action was supposed to be analogous to that of galvanism and animal magnetism. Perkins did not have great success in this country, but in England his tractors became the vogue until the foolishness of it all was demonstrated by John Haygarth, a physician of Bath, who showed that similar cures could be effected by wooden tractors.

Probably the first medical book published in this country appeared in Boston in 1708. It was 'The English Physician, containing admirable and approved remedies for several of the most unusual diseases,' by N. Culpeper, Doctor of Physick. The reprint was published by Nicholas Boone, at 'the Sign of the Bible,' near the corner of Schoolhouse Lane. Nicholas Culpeper (1616–1654) was an English writer on astrology and medicine. Previous to publishing 'The English Physician' in London, he had issued an English translation of the College of Physicians' 'Pharmacopœia,' in 1649. This unauthorized translation excited the indignation of the College of Physicians to the point of exclaiming that the book was 'done (very filthily) into English by one Nicholas Culpeper.' The book, however, had none of the de-

fects attributed to it by the monopolistic College of Physicians and was so popular that three editions appeared in the next two years. In 1654 the name was changed to 'The London Dispensary.' 'The English Physician,' first published in London in 1653, had a large sale and many editions appeared, five before 1698. Culpeper, after publishing many other works, died of consumption at the early age of thirty-eight. The edition published in Boston in 1708 was a little book, having only ninety-four pages, and apparently because of its great popularity it was used up and has practically disappeared. There is one complete copy in the Boston Medical Library.

The first original work appears in the 'Inoculation Tracts,' of which we have already noted a few. Some were mere letters published apparently as broad sheets; others were more substantial volumes. Dr. John F. Fulton, in his biography of Zabdiel Boylston in the 'Dictionary of American Biography' (1929), lists seven papers written by Mather and Boylston in collaboration. There were at least fifteen or sixteen pamphlets published in Boston between 1721 and 1752. In the list given in the 'Catalogue of an Exhibition of Early and Later Medical Americana,' New York Academy of Medicine (1926), collected by the librarian, Dr. Archibald Mallock, two pamphlets are by the Reverend Benjamin Colman, Boston, 1721, and Dublin, 1722; one by the Reverend Increase Mather, Boston, 1721; two by the Reverend William Cooper, Boston, 1721, and Boston, 1730; one by Isaac Greenwood, the mathematician, Boston, 1722; four

by William Douglass, two in 1722, both published in Boston by J. Franklin, and two in Boston, 1730; the historical account by Zabdiel Boylston, first edition, London, 1726, second edition, Boston, 1730; one by the Reverend Edmund Massey, Boston, reprinted, third edition, 1730; and one by Nathanael Williams, Boston, 1752. In addition there are four pamphlets listed of which the authors are unknown; all were published in Boston between 1721 and 1730. Not all of these, of course, were by any means original medical observations. The ministers exchanged observations and objections, letters to friends, and friendly or unfriendly debates on paper. Some, however, in Fulton's list, were actual progress notes by Boylston of his observations on the effect of inoculation, and his book, published in 1730, is an actual account of his cases.

The next medical publication in Boston is Douglass's essay on scarlet fever, published in 1736. There do not seem to have been other original medical publications before 1775, although reprints of popular books in English and possibly translations may have been so in demand that the editions were exhausted and the books used up much as Culpeper's 'English Physician' has practically disappeared. The libraries of physicians such as James Lloyd, William Douglass, and Silvester Gardiner must have contained many current medical works. There was no public medical library at the time, and of course no hospital libraries.

What books would one expect to find in the library of James Lloyd if one could browse about on a winter

night in 1770? Surely, the library would be mostly from English sources, the books of his teachers of twenty-five years before. William Smellie's 'Midwifery' (1752), perhaps brought home by Lloyd from London, and a set of the same author's 'Anatomical Tables' (1754), would hold first place in the obstetrical corner. William Hunter's great work on the pregnant uterus would come later, for it was not published until 1774. Under surgery and anatomy, William Cheselden's 'Treatise on a High Operation for Stone' (1723), along with his anatomy (1713) and his atlas of osteology (1733); Lorenz Heiter's 'Chirurgie' (1718); Percivall Pott on 'Ruptures' (1756), 'Hydrocele' (1762), 'Fistula in Ano' (1765), 'Injuries to the Head' (1768), and 'Fractures and Dislocations' (1768); Albinus on the 'Bones and Muscles' (1747) and Winslow's 'Exposition Anatomique' (1732). None of John Hunter's works on surgery or physiology had been published in 1770. Physiology, however, would be represented by Stephen Hales's 'Statical Essays' (1731–33) on blood pressure; Albrecht von Haller's 'Elements of Physiology' (1759–66) and, perhaps, Robert Whytt's 'Involuntary Motions of Animals' (1751). In pathology one would hope to find Morgani's 'De Sedibus' (1761) and under medicine, Hermann Boerhaave's 'Elementa Chemiæ' (1732), 'Aphorismi' (1709), and van Swieton's 'Commentaries' (1741). In addition, of course, the works of Sydenham, Harvey's 'De Motu Cordis' (1628), Cowper's 'Anatomy' (1698), and Willis's works, including the 'Cerebri Anatomie,' from the seventeenth century. There would be many

others and among them, we hope, a 1543 Vesalius bound in vellum!

Medical education had begun before the Revolution in a more or less systematized manner through the efforts of Joseph Warren. He took pupils into his house, following the system well established by the older physicians, but in addition he attempted to give them some systematic instruction in surgery and medicine. His pupils included his younger brother, John Warren, and William Eustis, Samuel Adams, Lemuel Hayward, David Townsend, and Robert Williams. Warren's extensive practice and his marked activity in politics, combined with the fact that he was only thirty-four years of age when he died at Bunker Hill, makes it very difficult for us to see how he could have given much time to these pupils. Most of them were men ten years younger than himself, fresh from Harvard College. Samuel Adams and David Townsend were from the class of 1770. John Warren was graduated in 1771, William Eustis in 1772, and Robert Williams in 1773. Lemuel Hayward was a little older, having been graduated in 1768. All of these men were, of course, inspired by the ardent patriotism of Warren and all of them served on the side of the patriots during the American Revolution. As a matter of fact, with rare exception all the physicians under thirty-five years of age in Boston served on the side of the patriots. There were a few exceptions, notably Isaac Rand, Jr., who was graduated by Harvard College in 1761, and John Jeffries, who was graduated in 1763. Both of these men were pupils of James Lloyd and naturally their

tendencies turned toward the loyalists' side. Rand remained in Boston with Lloyd, whereas Jeffries went to Halifax with the British. Lloyd's influence in this direction, however, cannot be said to have extended to all his pupils, for the most ardent of all patriots, Joseph Warren, was his most famous pupil. The older men, involved as they were in practice among loyalist patients, naturally found it difficult to accept the Revolution.

On the whole, we can look back on this period from 1700 to 1775 as one of individual endeavor in medicine in Massachusetts. The outstanding man of the time from our modern point of view was undoubtedly Zabdiel Boylston with his smallpox preventive inoculations in 1721. It seemed doubtful if his work was completely appreciated during the time in which he lived. Men like Douglass, better trained, carried the whole group of physicians with them in opposition to Boylston for many years. Douglass, too, had many accomplishments to his credit, especially his accurate description of scarlet fever in 1736 and his development of the first medical society about the same time. Gardiner was a skilful surgeon, although primarily a man of business, who established his apothecary shop as early as 1744. James Lloyd, who came later and lived through the Revolution, was the first obstetrician of this country, a splendid, well-trained English physician, whose great work was to instil into the younger men the spirit of Cheselden and the brothers Hunter. The period closed with Lloyd and Gardiner as the outstanding older men in the field,

and with a host of younger men coming to the front who were to divide themselves into the loyalist camp and on the side of the patriots. Some of them, especially in the younger group, were to distinguish themselves greatly during the American Revolution.

CHAPTER IV

THE AMERICAN REVOLUTION AND AFTER

1775–1800

THE physicians of Massachusetts were actively engaged in the American Revolution although it cannot be said that surgery made any advance as a result of the war. The service rendered to the troops was scandalously crude, and few physicians from Massachusetts, with the exception of John Warren, did much more than ordinary field or hospital duty. Most of the difficulty was due to the fact that the medical department of the army was poorly organized and there were many disagreements between the officers in the general hospitals and the regimental surgeons. Except for Warren, the directors of the service were men from Philadelphia, and though Massachusetts furnished a large number of physicians who held minor positions, none of them rose to such eminence as that attained by William Shippen, John Morgan, and Benjamin Rush.

In spite of the relatively small part played by the physicians of Massachusetts, what they accomplished is not without interest. Practically every doctor served in some capacity and twenty-two physicians were members of the Massachusetts Provincial Congress in 1774 and 1775. Included in this group was Benjamin Church, of Boston, who later served as director-general of the army. He had been graduated from Harvard College in 1754, and, although he

does not seem to have received any special medical training, he practised medicine in Boston and was a more or less conspicuous figure prior to the Revolution. He was something of an orator and in 1773 gave the address on the anniversary of the Boston Massacre. Church also had the reputation of being a good physician and a skilful surgeon. In 1775 he received the appointment as director-general and chief physician of the army, a position offered to, but refused by, John Warren. With an unorganized medical department, his load was not an easy one, and he was soon hampered by the friction between the hospital and regimental surgeons. When investigation of the cause of this friction was under way, Church seems to have had a particularly unhappy time, and it was later shown that he was carrying on secret correspondence with the enemy. A council of war was convened in October, 1775, at which General Washington presided. Church explained that a letter, which had been found, written by him and addressed to the British, was 'calculated to impress the enemy with a strong idea of our strength and situation in order to prevent an attack at a time when the Continental Army was in great want of ammunition.' This explanation, however, was not accepted and the council was unanimous in judging Church guilty. On looking back at their decision, it seems doubtful if Church had criminal intentions in writing to the enemy. It must be remembered, also, that it was a time of jealousy and prejudices and party zeal ran high. Church was convicted by court-martial and, after spending a year in prison, was

liberated and sailed for the West Indies. Nothing was ever heard of the ship or its passengers, and it is supposed that the ship floundered at sea in 1776.

A much pleasanter story can be told of Joseph and John Warren, two brothers, both of whom played conspicuous parts in the American Revolution. Joseph Warren, the elder, we have already met as a teacher of young medical students before the war. He had been a pupil of James Lloyd and had assisted in the inoculations at Castle William. Five of Lloyd's pupils, all graduates of Harvard College, served in the army. Before actual hostilities broke out, Warren had become active in politics and was noted as a gifted orator. He, as well as Church, was one of the speakers at an anniversary of the Boston Massacre, and it was Joseph Warren who started Paul Revere on his famous ride. In 1775, when war actually came, Warren placed his patients under the care of one of his students, William Eustis, and went to Lexington, where he served in the ranks rather than assume a position as leader. He was made a major-general of the army later, after having refused the position of head of the medical department, which fell to Benjamin Church. Warren did not reach Bunker Hill until the contending forces had begun to fight. When he did arrive, Prescott, who was in command, offered to relinquish control of the troops to Warren, but Warren refused and fought as a private. He was killed during the fighting.

Joseph Warren's place as a patriot is well established, but less attention has been paid to his position as a physician. He was the first doctor in Massachu-

setts to give systematic courses in medicine to his students, and apprenticeship with him, although the contract was not always binding, covered a period of two years. Books for study were few, but bedside teaching was abundant, as Warren's practice was extensive.

His daybook, which is carefully preserved, throws much light upon the extent of his practice. Among his patients were John Hancock, John Adams, and Josiah Quincy. His average fees were three shillings, which always included medicine, and his largest medical fee was one pound eight shillings, which was for a case in midwifery. The charge for a surgical operation was somewhat higher: four pounds for an amputation of the thigh. On his busiest days, he averaged twelve to twenty entries in his daybook. Under the date of April 19, 1775, there appears only one entry, showing that after he had seen this patient and turned his practice over to young Eustis, he left town early in the morning. Warren returned to Boston the next day, however, and made several visits. The record in his daybook ends May 8, 1775.

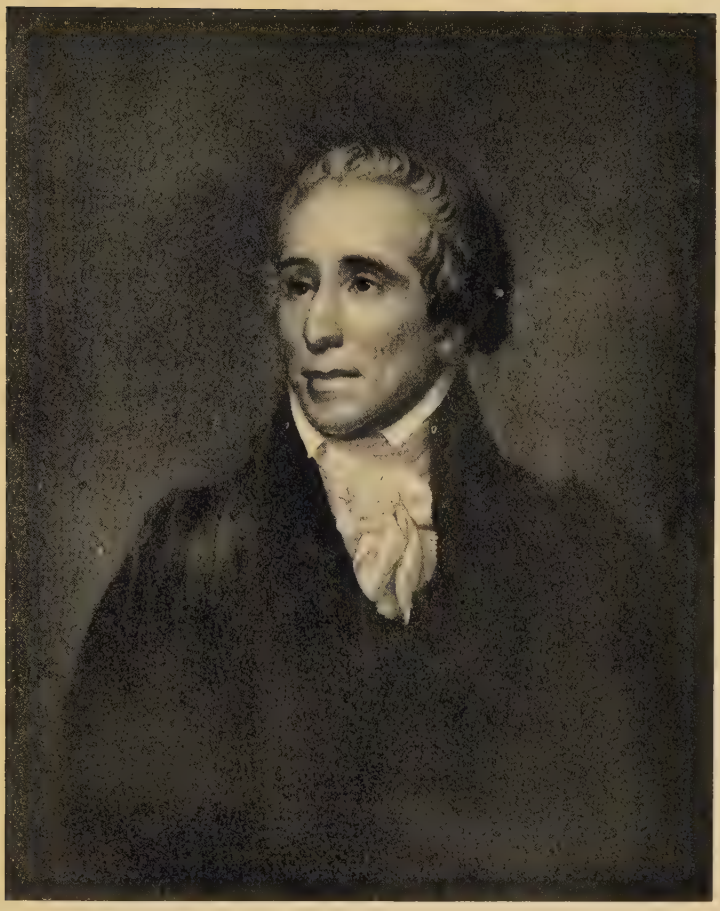
Joseph Warren enjoyed the confidence and respect of many of the leading physicians in Boston, most of them either ardent or moderate loyalists, at a time when they differed from him so markedly in their political views. His medical work, especially in relation to teaching, was carried on ably after his death by his younger brother, John Warren.

The younger Warren had been graduated by Harvard College in the class of 1771, a class, as we shall see, somewhat famous in the annals of medicine

in Massachusetts. John Warren spent two years with his brother and then settled in Salem, being associated with Edward A. Holyoke, then forty years of age, who had an extensive practice. When hostilities began, Warren served at both Lexington and Bunker Hill, volunteering, at least at first, as a private in the ranks, as had his brother. Later, however, he was assigned to the care of the wounded. When General Washington arrived, in July, 1775, Warren, not then twenty-two years of age, was appointed senior surgeon to the military hospital at Cambridge, his colleagues being William Aspinwall, Lemuel Hayward, and Samuel Adams, Jr. Here he remained until the evacuation of Boston. During this period, Benjamin Church was deposed and John Morgan, of Philadelphia, became director-general of the medical forces. Warren found great confusion in the medical department and he wrote to John Hancock in October, 1775, urging a more definite policy. When the British troops left Boston, Warren is said to have been one of the first surgeons to enter the city. He was later made senior surgeon to a military hospital established on Long Island, New York. After this period, he served in Princeton, New Jersey, but again returned to Boston in July, 1777, where he took up his duties as surgeon to the military hospital. Warren did what he could to make things run smoothly in the medical department, helped to straighten out the disputes between the regimental and hospital surgeons, and was active in establishing the hospitals which were so badly needed when nearly one fourth of the army was ill with either fever or

dysentery. When William Shippen succeeded John Morgan as head of the medical department, many of the suggestions made by John Warren were adopted. In his new hospital in Boston, which was near the present site of the Massachusetts General Hospital, Warren had an excellent chance to expand his ideas in regard to anatomical and surgical research and teaching. His private practice, also, became extensive, for at the death of his brother, many patients turned to him. In 1778 he formed a partnership with Isaac Rand and Lemuel Hayward to establish a smallpox inoculation hospital in Brookline. During the latter part of the war he continued as head of the military hospital in Boston and gradually came to be known as the leading surgeon of the town.

The Warrens and the younger men in Boston had no difficulty in deciding on which side of the conflict they were to serve. With the older men it was somewhat different. James Lloyd, for instance, had become so involved with the British as surgeon of the entire garrison before the war and as physician of many of their leaders that he found it difficult to join the side of the patriots. He remained in Boston, however, looking out for the British soldiers until after the evacuation, when he did equally good work for the Continental Army. He was careful to take no active part in the political life of the time and was exempt from military duty. He rather expected that the Revolution would not last long, that things would quiet down, and that the British would again gain control. When he found that this was not to be the case, he seems to have been equally generous in his



John Warren

treatment of the American troops, and it is said that when General Israel Putnam entered Boston, Lloyd was the first to welcome him as a guest in his own house.

The war, on the other hand, was opposed by Silvester Gardiner. He retired to Halifax at the time of the evacuation of Boston. James Pecker, another of the older men, also found it difficult to serve on the side of the patriots. He was temporarily arrested in 1776 and does not seem to have played any special rôle in political life after that. He continued his practice and later became an important member of the Massachusetts Medical Society. Samuel Danforth was in somewhat the same position as James Pecker, although a younger man. Danforth, who had an extensive practice in Boston, remained on the side of the British and after the evacuation of Boston was treated harshly by the inhabitants. His family had to flee. Apparently he was later forgiven and was able to reëstablish his practice.

Two of Lloyd's pupils also remained as loyalists, the more distinguished being John Jeffries, who had been graduated by Harvard in 1763. He was one of the few New England physicians who had received a medical degree, at that time, in Europe, having been graduated M.D. at Aberdeen in 1769. Jeffries also studied in London under John Hunter and William Smellie. When he returned to Boston, he was perhaps better equipped than any man in the medical profession in the city. Under Lloyd he took charge of the smallpox hospital on Castle Island in 1764, and it was he who first noticed the beneficial effects of

cold water as a treatment of this disease. It is said that four of his patients with delirium escaped from their attendants and plunged into the harbor. Jeffries noted that all of these patients were better for their sudden cold bath. The practice was adopted from that time on. Before the Revolution, Jeffries acted as an assistant surgeon to some of the British ships in Boston Harbor.

He was a close friend of Joseph Warren, although they took entirely different paths in 1775. We learn from a letter written at the time an interesting account of the last meeting between Joseph Warren and John Jeffries. Apparently Warren sent Jeffries a message to meet him secretly at midnight at the end of the wharf of the Charlestown ferry the night before the battle of Bunker Hill. Warren came over in a small boat with muffled oars and tried to induce Jeffries to join the Continental Army as a surgeon, and even asked him to accept a general commission as head of the medical services. Jeffries declined and the two friends parted. After the battle of Bunker Hill, it was General Howe who went to Jeffries and reported the death of Joseph Warren.

When the British evacuated Boston, Jeffries accompanied them to Halifax, where Howe made him surgeon-general to the forces in Nova Scotia. He later went to England, where he was appointed surgeon to the British forces in America after a rigid examination by John Hunter and others. He joined General Clinton's command in Charleston, South Carolina, but in 1780 was transferred to New York. Later Jeffries returned to England, where he settled

after having refused a position as head of the medical staff of an expedition about to leave for India in 1781. In England, he became interested in aerial navigation, and on his second trip in a balloon he crossed the English Channel from Dover to France, the first successful ship to cross the sea by air. In 1790, when the war was over, Jeffries returned to Boston, where he practised surgery, medicine, and obstetrics.

Another student of Lloyd's, Isaac Rand, having been graduated by Harvard College in 1761, practised obstetrics in Boston. He felt with Lloyd that the Revolution might be of short duration and he remained in Boston as Lloyd's assistant. He seems to have kept himself free from politics and, with Lloyd, was careful to do nothing to excite feeling against him.

Still another physician in Boston who did not join the side of the patriots was Thomas Kast, a graduate of Harvard College in 1769. He had served on some of the British ships and he received part of his education in London. The year before the American Revolution, he settled in Boston to practise obstetrics and surgery. He also had an apothecary shop. He remained a loyalist, but seems to have kept out of any political activity.

These few loyalists were offset by a large number of physicians in Massachusetts who served at Lexington, Concord, or Bunker Hill. Those that we are familiar with had all been graduated by Harvard College, and it seems worth while to recall their names and something about a few of them. The oldest was Timothy Minot, a practitioner in Concord. He had been

graduated by Harvard College in 1747. Oliver Prescott, a graduate in 1750, also took an active part in the American Revolution. He had been a student under Ebenezer Robie of Sudbury, and later he settled in Groton, Massachusetts, where he had an extensive practice. He took part in the battle of Bunker Hill, where his older brother, Colonel William Prescott, was a conspicuous figure. Prescott became a brigadier-general of the militia for the county of Middlesex, held many other important positions, and later was made a major-general of the Massachusetts militia. Another, Marshall Spring, of the class of 1762, left his practice in Boston to serve at the battle of Lexington. He was not a strong patriot, however, and had many Tory affiliations. He was nearly expelled from the country in 1776, but seems to have survived and continued his practice.

William Aspinwall, a graduate in the class of 1764, served in the medical department as a surgeon to a brigade. He was at the battle of Lexington, and later became director of the army hospital established in Jamaica Plain. David Townsend, graduating in 1770, was one of Joseph Warren's students. He was at Bunker Hill as a regimental surgeon. After more duty in the field in 1777, he was made a surgeon to the general war hospital in Boston. Later he returned to regimental service and was with General Washington at Valley Forge. In 1781 he was made surgeon-general to the hospital department of the army, and after the war became director of the United States Marine Hospital in Chelsea, where he served until his death in 1829. Samuel Adams, Jr., in the same class,

was also a student of Joseph Warren. He was at Lexington and served throughout the war, but died shortly after it, in 1788.

From the class of 1772 at Harvard College at least seven men became physicians and served in the American Revolution. The most distinguished member of the class in this capacity was William Eustis, another student of Joseph Warren. When Warren went to Lexington, he left his patients in Eustis's care. William Eustis became a regimental surgeon and went to New York with the army, where he established a close friendship with General Washington. He later served as a hospital surgeon. After the war, his career was distinguished. In 1788 he was on the Governor's Council in Boston and later became a Congressman. Eustis was Secretary of War under President Madison and later an ambassador to Holland. Finally he succeeded his fellow physician, William Brookes, as Governor of Massachusetts.

Another classmate, Thomas Welch, was a regimental surgeon during the war. He later became attached to the United States Marine Hospital in Charlestown. Morton Herrick, of the same class, was in service in some capacity. Samuel Tenney was practising in Exeter, New Hampshire, when word of the battle of Bunker Hill reached him. He rode from Exeter to Boston on horseback, arriving late at night, and at once, after finding his friend and classmate, William Eustis, began to care for the wounded. As a regimental surgeon we hear of him in Rhode Island, New York, and Delaware, where he was on duty to the end of the war. After the Revolution he did not resume

practice but entered public life. Miles Whitworth, also of the class of 1772, practised in Boston during the siege and acted as attending physician to the American prisoners wounded at Bunker Hill. These prisoners were thrown into the jail with scanty provisions, and some of them died. Whitworth was made the scapegoat, charges were made against him, and he lost much of his practice in consequence. He died in 1778. John Homans, another member of the same class, served at Bunker Hill, was later commissioned as a surgeon, and was at Saratoga in 1777 when Burgoyne surrendered. After the war he settled in Boston and became a prominent practitioner.

The names of many other Massachusetts physicians, besides those mentioned above, have been recorded as serving during the American Revolution. The following should be noted, with the date of their graduation from Harvard College: Nathaniel Perkins, 1734; Jonathan Perkins, 1738; Thomas Bulfinch, Jr., 1746; Ammi R. Cutter, 1752; John Flagg, 1761; John Thomas, 1765; David Cobb, 1766; Charles Jarvis, 1766; Lemuel Cushing, 1767; Lemuel Hayward, 1768; Robert Roberts, 1771; Walter Hastings, 1771; John B. Swett, 1771; Benjamin Curtis, 1771; John Sprague, 1772; Nathaniel W. Appleton, 1773; Robert Williams, 1773; Daniel Shute, 1775; Henry Adams, 1775; Aaron Dexter, 1776; Samuel Woodward, 1776; Ebenezer Crosby, 1777; Abijah Cheever, 1779; and John Crane, 1780. Of these men, a few deserve special notice.

Thomas Bulfinch, Jr., had studied abroad for four

years in London and Edinburgh, and received his M.D. degree in the latter city in 1757. In 1763 and 1764 he was associated with Joseph Warren and others at the smallpox hospital at Point Shirley. During the siege of Boston he remained in the town and suffered large losses of medical supplies which were taken by General Howe for the British troops. He does not seem to have taken an active part in the fighting. Ammi R. Cutter had served in the Indian wars in 1755. During the Revolution we hear of him at Ticonderoga. Later he had charge of two hospitals on the Hudson, and in 1777 he was made physician general of the eastern department. He kept an interesting diary of his army experiences. Bulfinch practised in Portsmouth, New Hampshire, after the Revolution, where he was a close friend of his classmate, Governor Wentworth.

Charles Jarvis, who had studied in England and France, was an ardent patriot. Before the war he had been in the legislature and served as orator in Faneuil Hall. He married the sister of Sir William Pepperell, but refused to go to England when his family left at the time of the evacuation of Boston. He does not seem to have been in very active service, but later we hear of him in the Marine Hospital at Charlestown.

Lemuel Hayward, of the class of 1768, was one of Joseph Warren's students. He served in John Warren's hospital in Boston until after the evacuation. Returning to Boston, he and Isaac Rand, Sr., apparently did most of the inoculations for smallpox until the work was taken up by John Warren and William Aspinwall. John B. Swett, who was a classmate of

John Warren, was studying in Edinburgh with William Cullen when the Revolution began. He did not return to America at once, however, but entered into the service of a merchant line of whaling and sealing vessels, thus acquiring funds to finish his studies in London and Paris. He returned to America in 1778 and took part in some of the fighting in Rhode Island. After the Revolution, he settled in Newburyport in 1780, but died the same year of yellow fever while caring for patients with that disease.

In addition to the above list, three men should be mentioned; all of them received honorary degrees of M.D. from Harvard later, although they were not graduates from the college. James Thacher served in the military hospital in Cambridge in 1775, before Washington took command of the troops. His was one of the first attempts to improve the personnel of the medical corps. An interesting account of his efforts is given in his own 'Military Journal,' which he kept carefully during the war. In 1776 he was sent to Albany, New York, where he established a hospital. Thacher distinguished himself later by writing the first medical biography in this country. Timothy Childs, also, was on duty at either Lexington or Bunker Hill. He received an honorary M.D. from Harvard College in 1811. John Brooks served his apprenticeship in medicine with Simon Tufts, Jr., of Medford. He served at Lexington and Concord and later in New York, where he rose to the rank of adjutant-general. He was a staunch supporter of General Washington during the critical period of March, 1783. After the war he returned to Boston to

take over the practice of his old teacher who was then at an advanced age. He entered politics, and in 1816 was elected Governor of Massachusetts. He received an honorary degree of M.D. from Harvard College in 1810.

The war ceased in October, 1781, with the surrender at Yorktown, but, somewhat before that time, some of the Boston physicians had returned to their homes, and those that had remained here were reorganizing their practice and interests. The war changed the medical profession in at least three ways: the preacher-physicians, of the Cotton Mather type, disappeared; systematic medical education began; and physicians organized themselves into societies. Medicine was practised and taught, from this time on, entirely by physicians. The preacher-physicians died out quietly, without apparent protest; the establishment of the medical school, on the other hand, was only accomplished after bitter fighting. During the revolutionary days, the only name of great importance to medicine in Massachusetts was that of John Warren; it was this same Warren who, in large part, instigated the Massachusetts Medical Society and established the medical department of Harvard College.

The Society, founded in 1781, is the oldest medical society in the United States with a record of uninterrupted meetings from its foundation to the present. It had its real beginnings in the Medical Society in Boston, begun by William Douglass in 1736, to which we have alluded. This society, how-

ever, lasted only about five years and many years elapsed before Cotton Tufts, of Weymouth, in 1765, attempted to form another medical society in Massachusetts. He drew up regulations which appear in a letter, sent to various physicians, asking them to meet at 'Gardners Tavern on Boston Neck at the hour of two p.m. precisely on the third Monday in March, 1765.' None of the men interested in this early venture came from Boston, and perhaps that is the reason that the society never got beyond the stage of its organization. It is presumed that the meeting took place, and perhaps a second meeting in June, but there the matter ended and we hear no more of the proposed society.

This was the time, however, just after the American Revolution, when many societies were formed. The American Academy of Arts and Sciences was incorporated in 1780; its charter resembles that of the Massachusetts Medical Society in both wording and arrangement. Among the original members were the following physicians: Edward A. Holyoke, of Salem; Charles Jarvis, of Boston; Oliver Prescott, of Groton; John B. Swett, of Newburyport; and Cotton Tufts, of Weymouth. John Warren was elected a fellow of the Academy in August, 1781, before the incorporation of the Massachusetts Medical Society. The Massachusetts Humane Society was also organized in 1780 and held its first meeting at John Warren's house.

The actual beginnings of the Massachusetts Medical Society were found in the Boston Medical Society, founded in 1780, with fourteen members. This prior society was largely organized to establish fee tables

for physicians. There was considerable jealousy among the members, especially in relation to John Warren, who was an active member. He had, the previous winter, established a course of lectures in anatomy and surgery at his military hospital, and, although only twenty-eight years old, was the outstanding physician of Boston.

The town of Boston at that time had about twelve thousand inhabitants. Cambridge, the seat of the university, was at least seven miles away, and it was necessary in order to reach Harvard College to travel over Boston Neck to Roxbury, keep on through Brookline to Brighton, and finally cross the Charles River at the Great Bridge, which stood where the Anderson Bridge is to-day. This must have been an arduous trip either on horseback or by carriage. John Warren went back and forth many times each month, after the medical school was established, in connection with his work as the Professor of Anatomy and Surgery. In addition, his long rounds on horseback to his patients took up many valuable hours. Boston was lighted only by oil lamps or tallow candles; slops were poured into the gutters; there was no running water or ice, and the ordinary sanitary laws we know to-day were unheard of. Keeping the difficulties of travel in mind, it is remarkable that these early physicians, especially those outside of Boston, had the courage to form a medical society. They were very faithful, moreover, about attending the meetings, many of them coming from the surrounding towns to spend a day in Boston for a morning and an afternoon session.

The actual founding of the Massachusetts Medical Society was due to the enactment of a bill in the legislature, November 1, 1781. Fourteen men had originally applied for incorporation of the society. Many of their names have been mentioned on previous pages: James Pecker, James Lloyd, Joseph Gardner, Samuel Danforth, Isaac Rand, Charles Jarvis, Thomas Kast, John Warren, John Linn, Benjamin Curtis, Thomas Welch, Nathaniel W. Appleton, Joseph Whipple, and Shirley Erving. It was a group of young men, with few exceptions: Pecker was fifty-seven, Lloyd and Gardner, fifty-three, Danforth, forty-one; all the others were under forty, including Erving, who was only twenty-two. The average age was a little more than thirty-five. Before the bill finally passed, the names of certain doctors outside of Boston appeared upon it; principally Edward Augustus Holyoke, of Salem; Oliver Prescott, of Groton; Cotton Tufts, of Weymouth; and John B. Swett, of Newburyport. James Lloyd, still a power among the Boston physicians, presented the bill. The first meeting of the society was held in the County Courthouse in Boston, November 28, 1781. Nineteen of the incorporators were present, and Edward Augustus Holyoke was elected president. Meetings were held regularly from then on. The officers of the society were invited to attend the public induction of the medical officers of Harvard College in Cambridge on October 7, 1783. John Warren on that day was appointed Professor of Anatomy and Surgery, while Benjamin Waterhouse was made Professor of Theory and Practice of Physic.

Warren was a member of the Massachusetts Medical Society at the time and had been one of its founders. Waterhouse, always at odds with his brother physicians, had not joined the Society and did not become a fellow until June, 1785.

One of the earliest functions of the Massachusetts Medical Society was to establish a library. This was done in 1782, and the library existed for ninety years, until 1872, when most of the books were given to the Boston Public Library, later to be transferred to the Boston Medical Library. Aaron Dexter was the first librarian and he began to collect books and pamphlets which have since grown to the splendid collection now in the Boston Medical Library. The Boston doctors began to give their books to the Library from the very start, and as early as 1787 we find James Lloyd presenting a number of volumes. Some of the books contained Lloyd's signature, and one, dated 1751, must have been in his possession when Lloyd was in London studying with Hunter and Smellie. Other doctors contributed also, and we find among the early donators the names of Cotton Tufts, Aaron Dexter, James Pecker, and Edward A. Holyoke. A list of the books in the library in 1788 shows that they had on hand, at that time, the large folio plates of Cowper's 'Anatomy,' Hunter's 'Gravid Uterus,' and those of Haller and Albinus. The library also contained the works of Alexander Monro, Robert Whytt, Boerhaave's 'Anatomical Lectures,' Pott's, Bell's, Sharpe's, and LeDran's 'Surgery.' In addition, there were the 'Edinburgh Medical Essays' and a few English society publications. There were only twenty-

six books in all, a small list with a marked English flavor.

The Society had other matters to attend to, besides the library. Ninety-five fellows were admitted during the nineteen years up to 1800 but only about thirty of them carried along the affairs of the Society. The others were neglectful and there was considerable bickering and dissatisfaction among them. The faithful ones had the interest of the Society much at heart; they would attend meetings in the morning and be on hand at an adjournment in the afternoon. Regular meetings were held three times a year in addition to the many council meetings. Because of the rapid growth in the population of the state and the number of practitioners of medicine, it was necessary for expansion to take place and the society was reorganized shortly after the beginning of the new century.

During the same period (1780–83) the Harvard Medical School had its organization. It was actually founded September 19, 1782, at which time the Corporation of Harvard College adopted the report submitted to them embodying a plan for the formation of a medical school. In November of that year, the Corporation appointed the first professor, John Warren, who accepted the Chair of Anatomy and Surgery in December. Later in 1782, Benjamin Waterhouse was chosen Professor of the Theory and Practice of Physic, and in May, 1783, Aaron Dexter was chosen Professor of Chemistry and Materia Medica. Warren and Waterhouse were inducted into office in October, 1783, and Dexter a short time later.

Funds for the Medical School had been accumulating for some years. Ezekiel Hersey, Esq., a graduate of the College in 1728, gave a thousand pounds to Harvard College, in 1770, towards the support of a Chair of Anatomy and Surgery, whenever one should be established. Other smaller gifts were added slowly and, although some money was at hand and the desire for organized medical teaching had already been expressed, the intervening war prevented the College from taking any action.

Before his actual appointment to the Chair of Anatomy and Surgery, John Warren had given courses in anatomical demonstrations to physicians of the army in his military hospital in 1780. As this was the first attempt in Boston to teach anatomy by means of regular demonstrations, it was necessary to observe a certain amount of secrecy on account of the existing prejudice against dissections. The course was given under the auspices of the Boston Medical Society at the hospital, and was attended by many literary and scientific men, including President Willard and members of the Harvard Corporation, as well as students from the College. These courses were continued the next year, and a third course, given in 1782 in the 'Molineaux House' on Beacon Street, was attended by the senior class of Harvard College. It was John Warren's habit to give certificates to students who completed his course of private lectures. When the Medical School was actually started, Warren set to work with zeal and energy, which had come to be recognized as one of his characteristics. 'With few books of instruction, without a teacher

as guide, or a model as aid, the preparation of the lectures was a task that would have staggered any man less courageous and determined than he. The lectures were a novelty about Boston, and it was not always convenient to procure subjects suitable for demonstration. When the resurrection men failed him, Warren used to advantage material from the hospital, arms, legs, etc., procured after operations. It is said that Warren never wrote out a course of lectures and seldom used notes. His style was forceful when unaffected, and had an originality which made a great impression upon his pupils. He was so alive to his subject that he seldom failed to carry conviction to the minds of his hearers.' [1] When some French surgeons came to this country, Warren soon acquired sufficient knowledge of the language to take advantage of the books they offered him. He studied Sabatier's 'Anatomy' till he was thoroughly posted in all it contained, and so he made his lectures more regular and uniform. The first lectures were attended by about twenty students and 'those members of the two senior classes at college who had obtained their parents' consent.' The lectures were often two or three hours long, a heavy strain on Warren in addition to his large practice. We have mentioned, also, the difficulties in travelling from Boston to Cambridge. Part of the time Warren could use the Charlestown Ferry to Cambridge, but when it was impeded by ice, he had to take the long route through Roxbury and Brookline. Apparently he felt that the work was too much for him, for he twice offered to

[1] Harrington, T. F.: *The Harvard Medical School*, 1905.

resign, but he was prevailed upon to retain the position.

Waterhouse, on the other hand, lived in Cambridge and his practice was not as extensive as that of Warren. Born in Newport in 1753, he left that town on the last ship sailing in 1775, on his way to study with his uncle, John Fothergill, the leading practitioner of London. Fothergill sent the young Waterhouse to Edinburgh, where he studied with Cullen, Black, and Monro. Returning to London, Waterhouse entered the family of Fothergill and continued the study of medicine as well as experimental philosophy, mineralogy, and botany for three years. Subsequent to this period, he went to the University of Leyden, then the leading medical school of the world, where he spent four years, being graduated in 1780. When he returned to Newport in 1782, he was probably the best-educated physician who had ever come back from Europe to this country. He was only twenty-nine years old, but in spite of his youth he was elected to the Chair of the Theory and Practice of Physic. In trouble from the start, not only with his associates at the Medical School, but also with the Boston practitioners, Waterhouse seems to have had an unfortunate feeling of superiority, due to his long training in Europe, and he adopted a pedantic manner which brought upon him only ridicule and enmity. The relations between Waterhouse and Warren were often strained and, strange as it may appear to our ears, they accused each other of deceit, double-dealing, lying, and slander. It often required a vote of the Corporation to keep the two from personal encounter.

In addition to Waterhouse's lectures in medicine, he gave courses on natural history, mineralogy, and botany, from 1788 on. These lectures are said to have brought him more reputation than his lectures in medicine. In 1788, Waterhouse also published a synopsis of his lectures on theory and practice, at the same time resigning from the School. Subsequently, he withdrew his resignation and kept on, although he, apparently, was far from satisfied with his position. His real interests were more in botany and natural history than in medicine. While in Europe, he had met John C. Lettsom, who became Fothergill's successor in London. From Lettsom, Waterhouse received a splendid collection of minerals and other natural history specimens which formed the basis for the Natural History Museum at Cambridge. Waterhouse also established the Botanical Gardens. All his work up to this time, however, seems to have been relatively insignificant compared with his vaccination experiments begun in the very last year of the century. This work, in some ways more important than anything that had been done in American medicine before its time, will be commented upon subsequently.

While Warren and Waterhouse were having their difficulties in Cambridge, the College was also in conflict with the Massachusetts Medical Society in regard to the rights of bestowing medical degrees. The Medical Society, in their charter, had the authority to examine candidates and to grant certificates of competence in medical knowledge. The interests of the two, however, were too closely allied

to admit of a very serious conflict, and the matter was settled, after many committee meetings, by having both give an examination. The first graduates of the Harvard Medical School were George Holmes Hall and John Fleet, who received their degrees of Bachelor of Physic in July, 1788. This degree was granted until 1811, when it was changed to M.D. Later Hall and Fleet were examined by the Massachusetts Medical Society, in addition, and were accepted as fellows.

One of the problems which perplexed the School in its early days was its inability to find clinical material. Fortunately, Waterhouse was not interested in the clinical aspects of medicine and his lectures were entirely theory; he thus avoided the need for clinical material. The only patients seen in the early days by the students were those of John Warren. The first lectures were given in the basement of Harvard Hall; later in the rooms fitted up in Holden Chapel. It was not until some years later that clinical work was arranged through the Boston Almshouse, situated on Leverett Street, where about fifty patients were cared for. Warren and Dexter taught in the Almshouse, the privilege coming through Warren, who had been visiting physician there for many years. Waterhouse apparently had some position at the Marine Hospital, established in Charlestown in 1803. These two hospitals, with the Boston Dispensary, incorporated in 1801, in addition to a few beds at the State Prison at Charlestown, erected in 1805, were the only clinical facilities for the medical students of the time. The School progressed rather feebly

through these early years and was not finally reorganized and set upon its feet until 1811.

It is interesting to note how quickly the animosities which arose during the war disappeared, and men like Lloyd and Jeffries, who were marked loyalists, were taken back into the fold of medicine without question. Lloyd, of course, was the leading exponent of the Massachusetts Medical Society. Jeffries, on his return from Europe, at once took up practice in competition with the patriots who had stayed at home. There was still an unsettled feeling about the American Revolution, and before the surrender of Yorktown, many Massachusetts physicians must have thought that the war was only an interlude, that things would quiet down and the British again be in command. It will be remembered that the Massachusetts Medical Society, formed of both loyalists and patriots, was organized before the surrender of Yorktown. The need for organization was obvious even though people had different views in regard to the war.

As soon as the Society was formed, it seemed desirable to the members to publish transactions and various papers read at their meetings. The first volume of the 'Medical Communications of the Massachusetts Medical Society' was printed in Boston and appeared in 1808. Part I of this volume, however, was printed in 1790, so that there was a period of eighteen years after the first communication before publication was resumed. It is interesting to see what type of paper was written in 1790 by the early members of this Society.

The first president, Edward Augustus Holyoke, contributed the opening paper to the volume. He was interested apparently in the relation between weather and epidemics, and his paper is a report of medical diseases which occurred in Salem for the year 1786. Each month is reported upon separately: first the weather report, then the diseases which prevailed during that month. January and February of 1786 were healthy months. March was stormy and there were many more diseases reported: 'dyspepsiæ, coughs, odontalgiæ, and worms very frequent; next in frequency were febrile disorders, chiefly pleuritic, pleurodynæ, colics, and rheumatic complaints.' About the middle of the month the 'chin cough' (whooping cough) made its appearance. In April, he says, 'pertussis was now epidemical amongst children; nor did adults escape, for several suffered severely by it.' In May and June 'chin cough' continued unabated and seems to have lasted pretty well through the summer. In August, Holyoke found a case of true scurvy in a lad returning from a fishing voyage. He reports: 'This is a singular occurrence with us, as I do not remember to have seen for nearly forty years, any one person concerned in the cod fishery come home with this disease till now.' We are glad to know that the lad recovered 'by the help of a vegetable and fruit diet, a few mild purges, etc.' By October, pertussis had gone; dysentery, on the other hand, had become more common. With the coming of the cold weather most of the febrile disorders disappeared. In his comments in general, he mentioned *rickets*, a disease formerly 'pretty common

here, and more especially among negro children, as I very well remember; but is now become so rare that I have not seen it, more than three or four times, these eight or ten years.' He expresses the opinion that this disease is becoming extinct.

Another disease which Holyoke saw little of was *colica pictonum*, or 'dry belly ach,' as it was called. 'This painful and distressing complaint, till about twenty-four or twenty-six years ago, was so frequent, that it was no uncommon thing to have six or eight, or more patients, ill of it in the course of a winter; but now for these twelve or fifteen years back, I imagine there have not been five persons ill of it in this town, if we except a few who dealt in lead, and who it was evident, derived their disease from that source, such as painters.' He calls attention to the fact that the disease used to be much more common in people who drank excessively, but, he says, 'it is a melancholy truth I fear, that intemperance is as prevalent at this period, as it has been these forty years.' He then asks the question whether the lead could have come from the pewter which, he says, had passed into general disuse. Formerly practically all drinking-vessels in the houses of the poor were pewter: pots as well as dishes, plates, basins, and porringers. 'But the use of pewter is now very much laid aside, and in the revolution of fashion, has given way to the more modish stone, or, as it is commonly called, Queen's ware.' He concluded his report by observing that 'acute diseases are much less frequent as well as less fatal than formerly; and that chronic diseases, particularly *phthisis pulmonalis*, have taken their place; and that

our species descend to the grave by paths, a little different from the old ones, yet they arrive at it no faster than formerly, as our bills in mortality, in proportion to our numbers, are by no means increased.' This paper of Holyoke's is typical of his time and shows the strong influence of English medicine on Massachusetts medicine; a similar contribution might easily have been written by Sydenham or Fothergill, had they lived in Salem in 1786.

Another paper in the same volume, by Nathaniel W. Appleton, is 'An Account of the Successful Treatment of a Paralysis of the Lower Limbs, occasioned by a curvature of the Spine.' This paper is interesting because it brings to our attention again the fact that books written in England were carefully studied in this country. Percivall Pott had described this condition, tuberculosis of the spine, and its treatment in 1779; Appleton refers to the account given in Pott's 'Chirurgical Works,' 1783.

Other papers in the same volume were by men whose names are already familiar to us: Isaac Rand, Sr., Isaac Rand, Jr., Thomas Welsh, and Thomas Kast. There was no paper on smallpox, although the disease was still prevalent.

As soon as the British had evacuated Boston in 1776, smallpox was found in various parts of the town, and to prevent its spreading among the inhabitants, the American Troops stationed in Boston were subjected to inoculations with, according to Thacher, 'a successful result.' For this purpose, hospitals were established in various parts of Massachusetts, particularly at Cambridge and Brookline,

where Isaac Rand, William Aspinwall, and Lemuel Hayward inoculated many hundreds of people. The disease again visited Boston in epidemic form in 1792, and the whole town is said to have been inoculated within a few days.

We obtain some idea of the practice of medicine in the later part of the century from the description given in Holyoke's paper noted above. The practitioners were in every sense of the word general practitioners, as specialties, except for obstetrics, were not known. Most doctors lived at some distance from other physicians and in cases of emergency they were obliged to rely upon themselves alone. Those physicians who had studied abroad, notably, of course, Lloyd, acted more in a consulting capacity. His practice, however, was partly obstetrics. Other men at this time, also, took up this specialty. Apparently they were not always paid and we take note of an advertisement appearing November 10, 1781, in the 'Boston Evening Post and General Advertiser,' as follows:

> The physicians of the Town of Boston hereby inform the public that in consideration of the great fatigue and inevitable injury to the constitution in the practice of midwifery as well as the necessary interruption of the other branches of their profession, they shall for the future expect that in calls of this kind the fee be immediately discharged.

CHAPTER V

THE EARLY NINETEENTH CENTURY

1800–1846

WITH the opening of the century and even a few months before 1800, came the work of Benjamin Waterhouse on cowpox vaccination. It is rather strange that this man, so queer and difficult to get along with, always at odds with his colleagues, especially with John Warren in relation to the early days of the Harvard Medical School, should have made such a striking contribution to medicine in Massachusetts as were his vaccination experiments. He had the advantage, however, of a long English training and the friendship of a relative, John C. Lettsom, of London; it was from Lettsom that a copy of Jenner's classic book, 'An Inquiry into the Cause and Effects of Variolæ Vaccinæ, a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of the Cow-pox,' reached Waterhouse in the beginning of the year 1799. Jenner's book had been published in June, 1798, giving his experiences with vaccination by cowpox virus as a means of preventing smallpox. The knowledge of the value of this procedure was not new even in Jenner's time, for many of the milkmaids in the vale of Gloucestershire had noticed that, after they had been innocently inoculated with cowpox on their hands from the cow's udders, they were *not* subject to the more terrible disease of smallpox.

Edward Jenner, however, put these casual observations to a scientific test and his discovery entitles him to a place in the first rank of those who have improved the art of medicine.

Waterhouse, keen to sense the value of Jenner's work, wrote: 'I was struck with the unspeakable advantages that might accrue to this country, and indeed to the human race at large, from the discovery of a mild distemper that would forever after secure the constitution from that terrible scourge, the smallpox.' He received, soon after this, a book by George Pearson, of London, confirming Jenner's discovery and, at once, drew up for the 'Columbian Sentinel,' a newspaper, a brief communication which was printed March 12, 1799. The paragraph, entitled 'Something Curious in the Medical Line,' simply gave the essential part of Jenner's work as well as the comments of George Pearson. This publication shared the fate of most new discoveries reported in newspapers, and it would have been soon forgotten except for the persistence of Waterhouse. He, at a meeting of the American Academy of Arts and Sciences held in Cambridge, with President John Adams in the chair, exhibited Jenner's book and explained the contents. 'The reception of this communication was much to my satisfaction,' reports Waterhouse, and he prepared a more formal contribution for the next quarterly meeting of the Society. Before this date came around, however, he had received another report from England; this in the form of a book by William Woodville, physician to the smallpox and inoculation hospitals in the city of London, giving

a review of his cases, the results of which bore out in every way Jenner's original contribution.

Waterhouse sent to England for some of the vaccine or cowpox matter for trial and, after several fruitless attempts, obtained some 'by a short passage from Bristol.' He, without hesitation, inoculated his five-year-old son on July 8, 1800; later he inoculated another son, three years of age, and following that a boy of twelve. All the vaccinations apparently 'took,' but the real test of protection was to come later; it must be proved by actual experiment that the patient, so protected, was actually immune to smallpox. Waterhouse, therefore, turned to his friend, William Aspinwall, of Brookline, who conducted a smallpox hospital, where original inoculations by the method of Boylston were carried out. He wrote, in August, 1800, asking if Aspinwall would 'try the experiment on inoculating some of my children who have already undergone the cowpox'; Aspinwall consented at once and chose the boy of twelve, the third child inoculated by Waterhouse, as a test. Direct inoculation of the smallpox matter was used and, although the boy's arm became infected in a day or two, he was able to leave the hospital and return home on the twelfth day after the experiment, without having 'the slightest trace of the disease.' This crucial experiment was so successful that, later, other members of Waterhouse's family, including some of the servants, were subjected to the same test with the same results.

The first report of these vaccinations by Waterhouse appeared as a pamphlet forty pages in length, with the long title, 'A Prospect of Exterminating the

Small-Pox; being the History of Variolæ Vaccinæ, or Kine-Pox, commonly called Cow-Pox; as it has appeared in England: with an Account of a series of Inoculations performed for the Kine-Pox, in Massachusetts. Printed for the author, at the Cambridge Press, by William Hilliard, and sold by him, and other booksellers in Boston. 1800.'

Only a few physicians in Boston and elsewhere were apparently interested in these experiments of Waterhouse; one or two visited his patients for the purpose of learning something of the 'new inoculations.' There were some malicious reports in regard to the success of the inoculation, but they appear to have been groundless. Waterhouse soon received a number of applications to vaccinate families, but declined to try the method on any person outside of Cambridge until he was sure of the results from Aspinwall's hospital. When it was obvious that these children were protected from smallpox, Waterhouse extended the benefits as widely as possible and introduced the method into the hands of other physicians in whom he had confidence. His method of treatment, however, fell frequently into the hands of practitioners who disregarded his cautions and there were some untoward results. A disagreeable incident took place in Marblehead, eighteen miles from Boston. Waterhouse had vaccinated two persons in the town, one of them a son of a physician. The physician took the virus from his son's arm and with it vaccinated forty persons. Another physician obtained some virus from the arm of a sailor who had recently come from London. Apparently this material was a mixed virus containing

some smallpox matter; as a consequence, smallpox spread rapidly throughout the neighborhood and the public became so alarmed that the municipal authorities took a hand. Waterhouse requested that the Massachusetts Medical Society appoint a committee to visit Marblehead to inquire into the facts of the disaster, but the committee did not execute their commission, as only one of the three physicians appointed saw fit to attend to it.

Not dismayed by the trouble, Waterhouse sent to England for fresh vaccine, and recommenced his vaccinations in March, 1801. He was rejoiced to find that these new inoculations presented all the characteristics of the first cases in his own family.

The news of the final success of vaccination spread rapidly, especially into the Southern States, and Thomas Jefferson, then President, wrote to Waterhouse from Washington, December 25, 1800, 'In this line of proceeding, you deserve well of your country; and I pray you accept my portion of the tribute due you, and assurance of high consideration and respect.' After some difficulty with the virus sent to Jefferson, which had apparently spoiled on the long trip to Virginia, a new lot was conveyed to the President and Jefferson was inoculated successfully August 6, 1801. The President from then on became an ardent advocate of the method.

In spite of the success of vaccination in the South, Boston and Massachusetts physicians did not accept the work of Waterhouse. The man and his experiments could not be separated; many of the profession hated the one and refused to grant the value of the

other. In 1802, when smallpox was again prevalent in Boston, Waterhouse concluded to make another serious effort to convince the profession and the public of the power of vaccination and to secure its general introduction into the town. He therefore communicated, May 31, 1802, with the Board of Health, setting forth the facts as he then visualized them. The Board appointed promptly a committee of seven reputable physicians, including Waterhouse, who, in August, 1802, vaccinated nineteen children at the health office. The physicians were James Lloyd, Samuel Danforth, Isaac Rand, John Jeffries, John Warren, and Charles Jarvis. A more representative group of Boston physicians could hardly have been chosen; the Board of Health treated Waterhouse quite differently than had the Massachusetts Medical Society. In November, twelve of these children were sent to a special hospital erected on Noddle's Island, where they were inoculated with matter taken from a patient in the most infectious stage of the disease. Some were inoculated a second time and control cases were used. All the committee were convinced that cowpox was 'a complete security against the smallpox.'

This decisive experiment had the desired effect of definitely establishing the practice of vaccination in Massachusetts. Other experiments were tried near by and all were successful. Waterhouse's second report was published in 1802 at Cambridge, a much longer and more thorough communication than the first, giving the actual notes of his cases as well as numerous extracts from the literature.

The success of Waterhouse's vaccination was granted, at last, by his brother physicians; the man was never accepted, even by his closest colleagues. Things were not going well at the Medical School, and there was continued friction between Waterhouse, the Professor of Theory and Practice of Medicine, and John Warren, the Professor of Anatomy. Waterhouse was formally charged, before the Corporation of Harvard College, with 'embarrassing the affairs of the medical institute; secondly, being engaged in support of plans inimical to its interest, and, thirdly, being guilty of duplicity and want of veracity.' His defence was strong and he was able to show that his enemies were actuated by selfish motives. In spite of his victory, Waterhouse sensed the feeling against him and he resigned from the College in 1812, after a service of nearly thirty years. He withdrew largely from the profession and devoted himself to literary work, occasionally writing on medical subjects.

Waterhouse's character was a most unusual one. He deserves the greatest credit for the method by which he convinced the physicians of the New World of the value of vaccination. All his other work, including the development of his department at the Medical School, is insignificant compared with his work on vaccination, and he may truly be called 'the Jenner of America.' [1] He died in Cambridge in 1846, just before the public demonstration of the value of ether as an anæsthetic.

Not being on good terms with the Massachusetts Medical Society, Waterhouse did not use their

[1] Welch, W. M.: *The Jenner of America.* Philadelphia, 1885.

'Medical Communications' in the publication of his reports. The Society, however, was not inactive in the production of other works. We have already noted the first number of the 'Medical Papers' published in 1790. In 1808 these publications were resumed and papers soon followed by Oliver Prescott, Jr., James Thacher, John Collins Warren, and many others. The annual address before the Society, the first of which was delivered in 1804, was printed in 1808, the first of a long series. The 'Medical Communications' of the Society were continued until 1880. In 1808 the Massachusetts Medical Society also sponsored the 'Pharmacopœia' prepared by James Jackson and by John Collins Warren. Two years later, the 'American New Dispensary,' written by James Thacher, was published by the Society.

In addition to these books, a new medical journal was started, first entitled the 'New England Journal of Medicine and Surgery,' in 1812, later changing to the 'Boston Medical and Surgical Journal,' in 1828. The establishment of the 'Journal' was due largely to the instigation of John Collins Warren ten years after his return from studies abroad and when he had settled in Boston as an assistant to his father, both in practice and in the Medical School. James Jackson agreed with the plan, and these two, associated with John Graham, Jacob Bigelow, and Walter Channing, started the 'Journal.' Later, George Hayward, John Ware, and John W. Webster joined the enterprise, the group forming a club which met once a month to dine and read the papers submitted. In the first number of the 'Journal' there appeared papers by John Warren,

James Jackson, John C. Warren, Jacob Bigelow, and Walter Channing.

John C. Warren, at this time thirty-four years of age, was already a man of marked ability. Walter Channing, having been graduated by Harvard College in 1806, and by the University of Pennsylvania Medical Department in 1809, had been appointed the first Professor of Obstetrics and Medical Jurisprudence in the Harvard Medical School in 1815. He was dean of the School from 1819 to 1847. John Ware, having received his degree in medicine from Harvard in 1816, was later to become president of the Massachusetts Medical Society and to take the chair of the Theory and Practice of Physics at the Harvard Medical School.

The work of Warren and Jackson in establishing a medical journal was coincident with the development of the Massachusetts General Hospital. The want of such an institution began to be felt by the community soon after the American Revolution. In 1798, Thomas Boylston, Esq., left a fund in his will for the erection of a smallpox hospital and a hospital for mental disease. William Phillips at about the same time left a sum of five thousand dollars to the town of Boston for the same object. By August, 1810, the need became obvious and a circular letter was issued by James Jackson and John C. Warren inviting subscriptions for a hospital. In February, 1811, a charter was obtained from the legislature, and a splendid gift was received from the Commonwealth in 1816. A site was chosen for the Massachusetts General Hospital in 1817 on North Allen Street, and Charles Bulfinch, the

distinguished architect of the State House and other prominent buildings in Boston, was asked to draw the plans. The corner-stone of the Hospital was laid on July 4, 1818, and on September 3, 1821, the first patient was admitted. James Jackson had been chosen Physician-in-Chief, and John C. Warren, Surgeon-in-Chief. It is interesting to note how slowly the Hospital grew. In 1833 there were only fifty-one patients in the general hospital and sixty-four in the hospital for mental disease. In October, 1837, James Jackson resigned, and about the same time Warren terminated his position as chief surgeon to the Hospital.

By 1810 it seemed desirable to move the Harvard Medical School from Cambridge to Boston, where the new hospital was to be built, and rooms were found in a building formerly used by John Collins Warren as a private dissecting-room, and by John Gorham for his lectures on chemistry. By this time, John C. Warren and James Jackson had been added to the original staff of three members. The School prospered, and six years later it was decided to erect a building for it on Mason Street. The same year, Aaron Dexter, one of the original teachers, resigned, and John Gorham was chosen in his place. Gorham had studied medicine with John Warren and was graduated, Bachelor of Medicine, in 1804. After spending two years in Europe, he returned to Boston to study with Dexter in chemistry. He was one of the founders of the medical journal, established in 1812 and was also associated closely with his friend, James Jackson.

We have already mentioned numerous incidents in the career of John Collins Warren, but here we wish

J. Jonson.

to point out his unusual training before he started to practise medicine. He studied first for one year with his father, John Warren, then proceeded to London, where he was attached to Guy's Hospital as a 'dresser,' under the famous surgeon, Astley P. Cooper. Later Warren spent two years studying in Edinburgh, Holland, Belgium, and Paris, under the best teachers. He returned to Boston in 1802, perhaps more extensively educated than any physician before his time. James Jackson, who was Warren's closest friend and was equally brilliant in all their endeavors, was graduated by Harvard College in 1796, a year ahead of Warren. He, too, was well trained in medicine, for he had taken an apprenticeship with Edward Augustus Holyoke in Salem and had spent nearly three years in England. Part of that time he was with Warren at Guy's Hospital. While there he first learned of Jenner's work on vaccination and studied the early cases under Woodville, so that when he returned to Boston, in October, 1800, he was able to share with Waterhouse the honor of being an authority on vaccination in this country, although, of course, he was a much younger man. Of the close association between these two physicians, Warren and Jackson, we hardly need to speak further. They were the first physicians to the Massachusetts General Hospital, established the new Medical Journal, in 1812, and both were the outstanding teachers of the Harvard Medical School. Neither Jackson nor Warren had many interests outside of their practice. Both desired to be the best type of physician, and both succeeded eminently in their desire.

While Warren and Jackson were stimulating medical education in Boston, another graduate of the Harvard Medical School was profoundly influencing the teaching of young physicians elsewhere in New England. Nathan Smith, born in Rehoboth, Massachusetts, in 1762, was the most distinguished early graduate of the Harvard Medical School. His family were poor and were able to give their son only an ordinary school education. The family moved to Chester, Vermont, and it was there that Smith became interested in medicine, taking an apprenticeship with a local surgeon of some repute, Josiah Goodhue. After three years with Goodhue, Nathan Smith began to practise in 1787 at Cornish, New Hampshire. He soon realized, however, his own shortcomings and sought to increase his education by going to the Harvard Medical School, only recently established. He was granted a degree of Bachelor of Medicine in 1790, the fifth man to graduate from the School.

Returning to Cornish, he began to practise, but, knowing the great advantage of a medical school education over that given by the old apprentice system, he approached the trustees of Dartmouth College in 1796 with a plan to establish a medical school at Hanover, New Hampshire. While awaiting a reply from the trustees, Nathan Smith went abroad, although his means were very meagre and it was necessary for him to borrow funds to make the journey. He visited Edinburgh and London, attending the medical lectures of Monro and Black, and purchased books for Dartmouth College, as well as apparatus for anatomy, surgery, and chemistry, so

sure was he that the trustees of the College would establish a medical school. After meeting John C. Lettsom in London, he returned to Boston in the fall of 1797, and began the first series of lectures in Hanover, New Hampshire, the next year, even before he was elected to the professorship. When his appointment was finally made, it is interesting to note that he occupied the chairs of Anatomy, Surgery, Chemistry, and the Theory and Practice of Physic, 'a whole settee of professorships.' In establishing the medical school at Dartmouth College, he was assisted by another graduate of the Harvard Medical School, Lyman Spaulding, who had obtained his M.D. degree in 1797. The difficulties in starting the school at Hanover, New Hampshire, were great; Nathan Smith's trials and discouragements are recorded in his many letters to his friend and pupil, George Cheyne Shattuck, of Boston. In 1812, he accepted the appointment of Professor of the Theory and Practice of Medicine and of Surgery in the medical department established at Yale College in that year. He began his courses in New Haven, Connecticut, in 1813. When the University of Maine wished to establish a medical school in 1821, the trustees turned to Nathan Smith, and he with characteristic energy started a school at Bowdoin and lectured there for five years, in addition to his teaching at Yale and his extensive consultation practice. Between the years 1822 and 1825 he gave lectures at the University of Vermont, thus establishing a fourth medical school in the course of thirty years.

In addition to his work as a teacher and an organ-

izer of medical schools, Smith was a practitioner of medicine and a surgeon far beyond his time. In 1824, for instance, he published an excellent treatise entitled 'Typhus Fever,' which was really a description of what we now know as typhoid fever. Nathan Smith's essay, founded on his own extensive observations and experience, was so accurate that his description of typhoid fever might well be used in a textbook one hundred years later. He pointed out two important facts: the disease is due to a specific cause, and it is also self-limited. The latter point was especially important as it was the idea of self-limitation of disease that was used so effectively by Jacob Bigelow in his paper on that subject in 1835. Smith's ability as a surgeon was characterized by the boldness of his operations long before the day of general anæsthesia, and the ingeniousness with which he devised new splints or apparatus to meet the requirements of a given case.

Massachusetts, also, was busy establishing new medical schools, but of quite a different kind from those so skilfully set up by Nathan Smith. These were the private schools, started about 1825. Some of them were to last twenty or thirty years. The Harvard Medical School, with about one hundred students and a faculty of seven or eight men, was fairly vigorous, but instruction was given only four months of the year. The demand for the year-around college was met by the private schools. There was a rival, also, in the Berkshire Medical Institute, incorporated in 1823. Located at Pittsfield, Massachusetts, and under the jurisdiction of Williams College, from 1823 to 1838 more students were graduated by this school

than by the Harvard Medical School. It continued to prosper until about 1845, when, because of the great increase in the number of medical schools throughout the country, and because of the greater clinical advantages offered by schools in larger cities, the Berkshire school gradually lost ground. The Massachusetts Medical Society also began actively to oppose it and the school finally expired in 1867. During its forty-five years of existence there had been on the faculty men of considerable importance in medicine, such as Alonzo Clark, Willard Parker, Elisha Bartlett, H. R. Storer, and others. It was certainly a vigorous rival for the Harvard Medical School and in some ways was much superior to it.

The Harvard Medical School at this time and, as a matter of fact, up to 1868, was really a private medical school, and most of the fees from students went into the pockets of the individual teachers. Supplementary to it, there were numerous private schools which gave summer or graduate courses. As early as 1827, Walter Channing advertised a course of lectures on midwifery during the summer months. Other courses were given by teachers connected with the School, such as those offered by John C. Warren and George Hayward. Another very strong and popular school was formed by Walter Channing, John Ware, and others; later, Oliver Wendell Holmes and James Jackson served on the staff. The pupils were allowed to use the Massachusetts General Hospital. Channing at the time (1834) was Dean of the Harvard Medical School, but this did not prevent him from giving courses in his private school.

Perhaps the most important of these schools was the Tremont Street Medical School, established in 1838, designed to give medical students instruction throughout the year. Among the early teachers were Jacob Bigelow, Edward Reynolds, and Oliver Wendell Holmes. Most of the school was conducted during the summer. During the winter months, courses were held in the evenings and were very similar to, if not exactly the same as, those given in the Harvard Medical School. This school was one of the best type, for its teachers were well-trained physicians and they made an effort to give young men a complete course of instruction, not dissimilar to our night schools at the present time, or the summer courses given in connection with the universities. The Tremont School later stimulated Harvard to lengthen their course and it also developed a brilliant group of young teachers, who were of great service to the Harvard Medical School when it was reorganized later.

These private schools, in a degree, supplemented the Harvard Medical School until, in turn, it absorbed all the best teachers and established a summer course to complete its scheme, giving medical students the advantages of a whole year of continuous instruction, under the same teachers. This movement reached its height about 1857, although it had started as far back as 1846, when a new set of buildings was built on North Grove Street and a new generation of teachers began to assume control of the School. These changes in policy lasted through until 1869, when Charles W. Eliot was elected President of the University.

The Harvard Medical School had never lacked in clinical facilities. As far back as 1810 the students were allowed to use the Boston Almshouse by the Overseers of the Poor of Boston, as well as the Boston Dispensary. Both of these institutions were governed by teachers of the staff of the School. After 1821, when the Massachusetts General Hospital was established, patients for teaching became even more numerous and, under the guidance of James Jackson and John C. Warren, students had free access to the Hospital.

Besides the development of the Harvard Medical School and the Massachusetts General Hospital, the period before 1846 is characterized by two other trends. The best students of the School went abroad to study and many of them turned aside from English medicine to French. Secondly, although the old apprentice system of teaching had died out, the father to son tradition continued and it was at its height during the first half of the nineteenth century.

The French influence was felt largely during the period from 1830 to 1840. Up to this time, medicine in Boston had been predominantly English and Scotch in both origin and character. The change did not come suddenly and was probably due in part, at least, to John Collins Warren, the first of the important men of the nineteenth century to study in Paris. It will be remembered that he spent two years, from 1800 to 1802, in Edinburgh and London, but a considerable portion of this time was devoted to the studies of anatomy and medicine in Paris. This was

before the days, however, of Pierre-Charles-Alexandre Louis (1787–1872), who was to be the dominating influence which transformed American medicine.

The first students were drawn from Boston to Louis about 1832, although a few had gone from Philadelphia before this date. Eight young men went from Boston and at least five of them became outstanding physicians of their time. They all had been graduated from the Harvard Medical School: from the class of 1832, went Henry I. Bowditch and J. Mason Warren; from the class of 1834, George A. Bethune, Herman B. Inches, and James Jackson, Jr.; from the class of 1835, George C. Shattuck, and from the class of 1836, Oliver Wendell Holmes and Robert W. Hooper. Most of these men stayed with Louis in Paris for at least a year and, although they all were not there at the same time, it must have been a pleasant group of enthusiastic young physicians from Boston who were to be found in Paris from 1832 to 1840. Associated with them were a number of young men from Philadelphia, also studying with Louis. Four at least became outstanding physicians: W. W. Gerhard and Casper W. Pennoch, who were in Paris from 1830 to 1833, among the early students of Louis, and William Pepper and Alfred Stillé, who were students from 1832 to 1838. There were undoubtedly others from the Philadelphia group. These men, on returning to America, brought a new view of medicine, for the practical common-sense of Louis appealed greatly to them.

Before Louis came to Paris, the medical world was

dominated by the work of Broussais, who had carried his rough schooling in the army into medical teaching and therapeutics. He believed that nature had no healing power and it was necessary to abort diseases by the most active measures. Broussais' method was to drive out disease by depriving the patient of his proper food and to leech him all over his body; as many as ten to fifty leeches were applied at once, in addition to extensive blood-letting. Broussais apparently had no conception of diseases as such, but considered all diseases to be due to local irritation of some organ. It was Louis who brought back a sensible point of view to medicine. As a young man he had been in Russia, where he observed a severe diphtheria epidemic. He returned to Paris, found an appointment in a hospital, and investigated thousands of cases of phthisis, and later of typhoid fever. By a statistical proof, he was able to show that much of the treatment inaugurated by Broussais was useless; many patients did better if they were not treated at all. This method of investigation by statistical proof, although not entirely new, was used to the greatest advantage by Louis and his name soon became known throughout the medical world. It was this practical use of facts and figures as opposed to sterile theorizing of the past that appealed especially to the young Americans. Oliver Wendell Holmes, one of his pupils, has given an interesting picture of the man. When Holmes was in Paris, Louis was about forty-seven, 'a tall, rather spare, dignified personage of sweet and grave aspect, but with a pleasant smile and kindly voice for the students with whom he came in per-

sonal relations.' Holmes recalls two lessons that he learned from Louis: first, to form a distinct and clear idea of the matter under consideration, and, secondly, always to substitute for vague approximations exact estimates. Holmes was much impressed by Louis's researches on phthisis and typhoid fever, but even more so by his 'Essay on Bleeding in Some Inflammatory Diseases,' based on cases carefully observed and numerically analyzed. The publication of this book marked the end of phlebotomy in medicine, and, along with Louis's other works, overthrew much of the false idea of violent therapy which had been entrenched in medicine for years. Louis taught that a great many diseases got well by themselves without any special medication, a theme that was enlarged upon at the same time by Jacob Bigelow in his address on 'Self-Limited Diseases.'

Louis should be considered as one of the greatest French physicians, who laid the foundations of modern clinical medicine. His effect was especially felt in Massachusetts through his many Boston pupils, and particularly through his regard and love for the young James Jackson, Jr., whom he considered one of his best students.

We have noted from time to time certain families in Massachusetts whose members practised medicine through many generations in the seventeenth and eighteenth centuries. As time went on, these medical families became more numerous. Only five families can be mentioned in any detail: the Warrens, Jacksons, Bigelows, Bowditches, and Shattucks; but there

were many others in the same period: the Homans, Minots, Storers, Cheevers, and Mixters.

One of the oldest and certainly by far the most distinguished was the Warren family. We have already mentioned the founder, Joseph Warren (1741–1775), and his younger brother, John Warren (1753–1815), and called attention to John Warren's work as an early teacher of students before the American Revolution, his accomplishments during the war and, more important, his work in establishing the Harvard Medical School and the Massachusetts Medical Society. John Warren's son, John Collins Warren (1778–1856) continued the work started so brilliantly by his father. Born in Boston he began his medical education in England, as was the fashion of the day. He studied in London about 1800 with the famous surgeon, Astley Paston Cooper. Warren acted as a dresser at Guy's Hospital, then went to Edinburgh for a year, where he received his M.D. degree, and later to Paris, studying there with Sabatier, Cuvier, Dupuytren, and Corvisart. When he returned to Boston in 1802, he found his father in poor health and he immediately relieved him of a large part of his practice, also helping him, a few years later, in the Department of Anatomy and Surgery at the Medical School. He succeeded to his father's professorship when John Warren died in 1815. John Collins Warren's name will always be associated with the founding of the Massachusetts General Hospital and the introduction of ether anæsthesia, events which were separated by a period of twenty-five years, but around which all that is conspicuous in Boston medicine

during that period is centred. In 1811 Warren also took an active part with James Jackson, Jacob Bigelow, and others in founding the 'New England Journal of Medicine and Surgery.' As a surgeon he became very well known. Operations in those days without anæsthesia were, of course, undertaken with considerable apprehension by both the operator and the patient. Warren was a bold and brilliant surgeon, but very painstaking. He was a good student, having been thoroughly trained in England and France, and many of his publications show the effect of his splendid background. Early in his career he became interested in comparative anatomy and began a collection of specimens, not unlike the one which he must have seen in London collected by John Hunter, which later was to form the Warren Museum of the Harvard Medical School. Warren was also active in establishing the American Medical Association. When the first operation under ether anæsthesia was performed at the Massachusetts General Hospital in 1846, Warren was approaching his seventieth year. He was not only the leading surgeon in Massachusetts, but was considered one of the outstanding men in the country. It was largely his position in medicine that made the demonstration so successful, and great credit should be given him for standing sponsor to Morton in this courageous and revolutionary experiment.

Warren's son, Jonathan Mason Warren (1811–67), also became a distinguished Boston surgeon. His health not being good as a young man, he remained in Harvard College, which he entered in 1827, for only a few months. After a trip to Cuba he returned

J. C. Warren

to be tutored by his father, serving under the old apprentice system, which was rather dying out at the time. He was able to enter the Harvard Medical School later, and received his M.D. degree in 1832. He, too, went abroad as his father had done before him, and studied in the great clinics of London and Edinburgh as well as Paris. In Paris, while studying surgery with Dupuytren, he came under the spell of Louis in medicine and joined that brilliant group of students so many of whom were to make names for themselves in medicine in this country, afterwards known as the 'pupils of Louis.' Warren spent two years in Paris and some time in Vienna, being away from Boston over three and one half years. On his return, he entered into practice, closely associated with his father, and began his surgical career in Boston. He, like his father, wrote extensively. In February, 1846, he was appointed to the staff of the Massachusetts General Hospital, and in October of the same year assisted his father at the first operation under ether. He was thirty-five years old at the time and soon became an ardent advocate of ether anæsthesia. Warren's health was never good and he could work only for short periods of time. He was connected with the Massachusetts General Hospital, however, until his death in 1867. The Warren name was carried on for two more generations through his son, the second John Collins Warren and his grandson, the second John Warren.

Another distinguished medical family in Massachusetts were the Jacksons. James Jackson (1777–1867) was a notable figure in New England medicine.

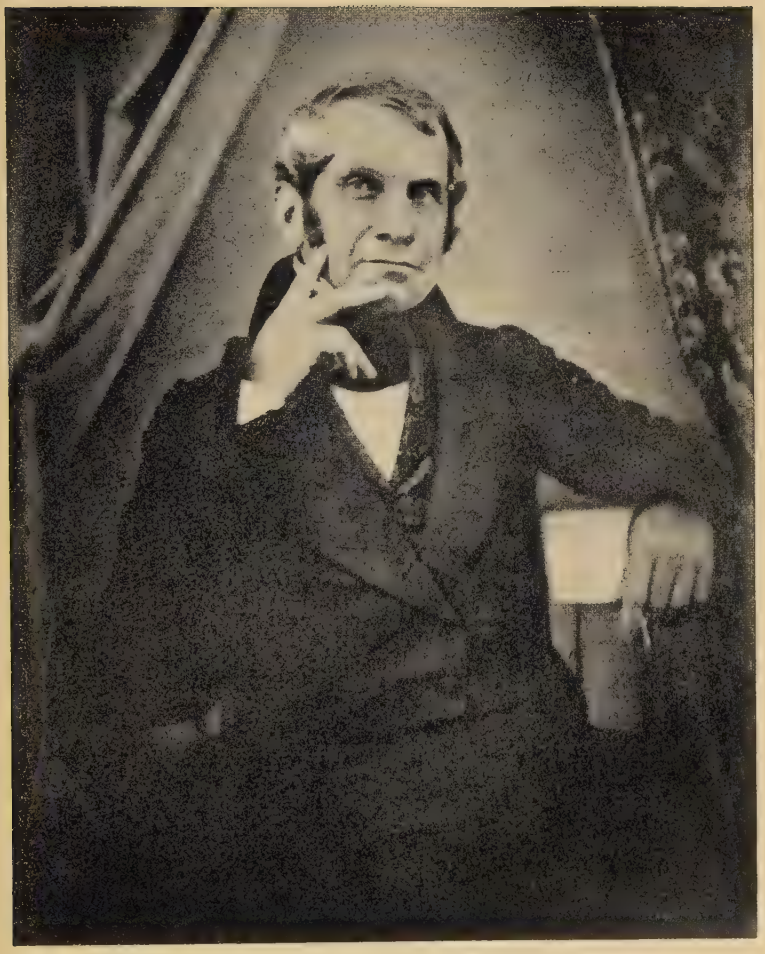
He became closely associated with John Collins Warren while at Harvard College and their friendship lasted throughout their lives. After graduating from the Harvard Medical School in 1796, he studied medicine with Edward Augustus Holyoke of Salem, later going to London, studying under Astley Paston Cooper and Henry Cline. By 1800 he had returned to Boston, enthusiastic over the new method of vaccination of Jenner for smallpox, which he had seen demonstrated by Woodville at the St. Pancras Hospital. Although he was not the first to vaccinate in this country, he quickly followed the work inaugurated by Benjamin Waterhouse. In 1810 he and Warren drew up plans for the Massachusetts General Hospital and it was opened for patients in 1821; Jackson was the first head of the medical department. In 1811 he helped to establish the 'New England Journal of Medicine and Surgery,' and for the next fifteen years was the largest contributor to that periodical. The first clinical paper from the newly founded Massachusetts General Hospital was an excellent description of alcoholic neuritis. He also wrote an early textbook on the practice of medicine, 1825, and reports on typhoid fever, 1838. When Waterhouse resigned from the Harvard Medical School in 1812, Jackson took his place. He, as a physician, and John Collins Warren as a surgeon, were the leading physicians of their time in Boston. His son, James Jackson, Jr. (1810–1834), was a remarkable young man who, having been graduated by Harvard College, went to Paris to study medicine under the famous teacher, Louis. He did some original work, made observations on a

serious cholera epidemic in Paris, an account of which he published in Boston in 1832, and returned to America to practise with his father. Two years later, this young physician died of typhoid fever.

The Bigelows were, also, a family of importance in New England medicine. Jacob Bigelow (1787–1879) was not only one of the foremost physicians of his time, but also the most learned botanist in the country. He was graduated by Harvard College in 1806 and then proceeded to Philadelphia, to study under Benjamin Rush, where he took his medical degree in 1810, from the University of Pennsylvania. Coming back to Boston, he became associated with James Jackson in practice, but soon showed a marked tendency to study botany. A scholarly book on the subject, 'American Medical Botany,' published from 1817 to 1820, was a work of international reputation. Later he published other books on the same subject, and he was appointed Professor of Materia Medica at the Harvard Medical School. He also became associated with the Massachusetts General Hospital and had a large consulting practice. In 1835 he read the annual discourse before the Massachusetts Medical Society, his paper being entitled 'Self-Limited Diseases.' The effect produced by this paper was profound, and we have the authority of Oliver Wendell Holmes that it did 'more than any other work or essay in our own language to rescue the practice of medicine from the slavery to the drugging system which was a part of the inheritance of the profession.' Bigelow had other interests besides medicine and botany; the Massachusetts Institute of Technology is

at least in part due to his untiring efforts, and he was active in establishing the Mount Auburn Cemetery in Cambridge.

Bigelow's son, Henry Jacob Bigelow (1818–1890), was also to distinguish himself in medicine. Graduated by Harvard College in 1837, he studied with his father, later attending the lectures of Oliver Wendell Holmes on anatomy given at Dartmouth College, and then was appointed a house officer at the Massachusetts General Hospital, an institution he was destined to dominate as a surgeon for most of his life. His health not being good, young Bigelow was sent to Cuba and then to Paris, where he studied medicine, but he finally took his M.D. degree from Harvard in 1841. Returning to Boston, he soon became a marked man in medical circles, for his method of establishing himself was rather unique, to say the least. He drove through the town in a dashing French cabriolet, his horses in gaily monogramed harness. Bigelow was a handsome man with a fashionable personal appearance. He started a private clinic, offering his services to the poor by means of signboards and circulars distributed among country practitioners. This method of making himself known, of course, aroused considerable jealousy and criticism, but he seems to have lived it down; he was too great a surgeon not to be looked up to by his brother practitioners. Bigelow was a pioneer in surgical pathology as well as orthopedic surgery. Witnessing the ether operation in 1846, he became a strong advocate for ether anæsthesia, studied the drug with Morton, and gave out the first written account of the discovery



JACOB BIGELOW

to the medical profession here and abroad. His surgical work of importance was largely in relation to the hip-joint; he was the first to excise this joint, in 1852. Later, he gave an adequate explanation of the mechanics of the joint, pointing out the value of its ligaments not previously described; this work culminated in a book on the subject in 1869. Bigelow also turned his attention to genito-urinary surgery and he devised means for crushing stones in the bladder. This operation, combined with his technique for reducing hip dislocations, made his name known throughout the world. In the latter years of his life, he disagreed somewhat with the newer policies inaugurated at the Medical School, and considerable friction developed between Bigelow and the new president of Harvard University, Charles W. Eliot. In 1882, Bigelow resigned from the School.

A fourth family of note were the Bowditches. Henry I. Bowditch (1808–1892) was a pioneer in diseases of the chest, and introduced the operation for tapping the pleural cavity. He was a son of the celebrated mathematician, Nathaniel Bowditch. Graduating from Harvard College in 1828, he received his medical degree from the same institution in 1832, later serving as a house officer at the Massachusetts General Hospital under James Jackson. In 1832 he went to Paris, where he was a student under Louis. During this period he became deeply interested in diseases of the chest, especially the work of Laennac, of Paris, who had invented the stethoscope for auscultation of the chest. Returning to Boston, he began practising general medicine, wrote

a book on the stethoscope (1846), organized, with John Ware, the Boston Society for Medical Observation, a society from which the Boston Medical Library was formed and did considerable scientific work in medicine with the use of the microscope. He suggested the possibility of tapping the chest in cases of pleuritic effusion. When the method was proposed there was considerable opposition to it, even by James Jackson, his teacher. The surgeons were also against it, but Bowditch persisted. An instrument was devised by Morrill Wyman, of Cambridge, and the first operation was performed April 17, 1850. Bowditch also did early work on tuberculosis, pointing out the advantages of a dry climate as one of the methods of treatment, was an active member of the Massachusetts Medical Society, and an officer for many years, and from 1859 to 1867 held the position of James Jackson Professor of Clinical Medicine at the Harvard Medical School. During the Civil War he was in active service. Bowditch should also be remembered for his pioneer work in forming the State Board of Health of Massachusetts (1869), the second in the United States.

Henry Pickering Bowditch (1840–1911), a nephew of H. I. Bowditch, was also distinguished in medicine and physiology in Massachusetts. He received his M.D. degree from Harvard in 1868, later studied abroad in Paris and Leipsic, with Claude Bernard and Carl Ludwig. Ludwig's laboratory was the centre of physiology at the time, and there young Bowditch made acquaintance with many men who were later to become physiologists of note. In this laboratory

he demonstrated the *Treppe* or step-wise increase of contraction of cardiac muscle under successive uniform stimuli, and the fact that, independently of the strength of stimulus, the muscle will either contract to the maximal limit or not at all. Returning to Boston in 1871, he became Assistant Professor of Physiology at the Harvard Medical School and soon established a laboratory in his department, one of the first in this country. His interests were broad, for he conducted research not only in physiology, but also in general biology, pharmacology, pathology, and other fields. He invented many types of apparatus now commonly found in physiological laboratories, and he was influential in founding the 'American Journal of Physiology.' With John Collins Warren, the second, he was chiefly instrumental in obtaining funds for the buildings built for the Harvard Medical School in 1906. For many years he was Dean of the School. His public services were extensive, for he was a member at various times of the Boston School Committee, a trustee of the Boston Public Library, and a most ardent defender of animal experimentation before the Massachusetts legislature.

We have mentioned earlier members of the Shattuck family who practised medicine in Boston through a number of generations. The first physician, Benjamin Shattuck (1742–1794), served actively in the American Revolution. His son, George Cheyne Shattuck (1784–1854), was educated at Dartmouth College and at the University of Pennsylvania, taking his M.D. degree at the latter institution in 1807. He began practice in Boston the same year. While at

Dartmouth he had formed a friendship with Nathan Smith, the first distinguished graduate of the Harvard Medical School, and they carried on a long correspondence for many years. Shattuck became president of the Massachusetts Medical Society in 1836. He assisted James Thacher in writing his 'American Medical Biography.' His gifts to Harvard College and to Dartmouth College were many, and he also endowed a professorship at the Harvard Medical School. His son, also George Cheyne Shattuck (1813–1893), was graduated by the Harvard Medical School in 1835. He also was much influenced by the teaching and personality of Louis, while studying in Paris with Bowditch and others. He returned to Boston in 1840 and settled in practice. Shattuck became connected with the Harvard Medical School as Professor of Clinical Medicine. In 1849 he succeeded Oliver Wendell Holmes as visiting physician to the Massachusetts General Hospital. He was, as his father had been before him, a president of the Massachusetts Medical Society. Two of his sons became physicians: Frederick Cheever Shattuck, who became Professor of Clinical Medicine in the Harvard Medical School, and George Brune Shattuck, who was editor of the 'Boston Medical and Surgical Journal' for over twenty years. The latter graduated from the Harvard Medical School in 1869 and studied in Paris and Vienna. He, like his father and grandfather, was also a president of the Massachusetts Medical Society, and on several occasions he was elected to the Board of Overseers of Harvard University.

The two most important contributions to medicine in Massachusetts between the years 1800 and 1846 were, first, the paper by Jacob Bigelow on 'Self-Limited Diseases,' published in 1835, and, secondly, the work of Oliver Wendell Holmes on 'Puerperal Fever' first brought to the attention of the medical profession in 1843. Bigelow's paper has been already noted but its far-reaching influence should again be emphasized. Prior to his time, the indiscriminate use of many drugs was the usual course pursued by physicians. No one had stressed the importance to medicine of recognizing the self-limiting character of many diseases, especially the acute infections. From 1835 on, there was much less drugging of patients, a practice which can be almost entirely credited to this remarkable paper of Jacob Bigelow.

The work of Holmes on puerperal fever, a few years later, was even more important in the development of medicine in this country. Oliver Wendell Holmes (1809–1894) was graduated by Harvard College in 1829. After graduation, he spent a year in Law School, but then turned to medicine, studying at the Harvard Medical School under James Jackson. Before taking his degree, he spent three years in Europe, particularly in Paris and Edinburgh. He received his M.D. in 1836 and began practice in Boston. His earlier papers were chiefly medical, although from his college days he had shown a great interest in literature as well as poetry. He was a physician to the Massachusetts General Hospital and Professor of Anatomy at Dartmouth College between 1836 and 1840. Two years later he became the outstanding

opponent of homœopathy in this country and published two brilliant essays on the subject.

The next year came his essay on the 'Contagiousness of Puerperal Fever,' one of the great contributions to medical science. Upon it rests Holmes's chief claim to permanent reputation in medicine. He pointed out clearly and concisely that puerperal, or childbed, fever was frequently due to contagion conveyed by the hands of physicians from one patient to another, or from a case of erysipelas to the mother lying-in. It was a severe condemnation of physicians, but Holmes did not hesitate to state the matter boldly, writing, 'The disease known as puerperal fever is so far contagious as to be carried frequently from patient to patient by physicians and nurses.' The essay was first read before the Boston Society of Medical Improvement and published in April, 1843, in the 'New England Quarterly Journal of Medicine and Surgery.' Unfortunately, this journal had a small circulation and ceased publication the next year, so that Holmes's important contribution was partly lost sight of. This was not the case, however, with the obstetricians in Philadelphia. They at once attacked him, and two of the leading surgeons wrote papers on the non-contagious character of puerperal fever. Holmes felt sure of his ground, although he waited some time before actually stating his views again. In the meantime, Semmelweis in Vienna had proved the points already suggested by Holmes, by careful experimentation in his wards. He isolated certain of his patients and was careful to see that they were not infected. His death rate dropped at once. Holmes,

OLIVER WENDELL HOLMES IN 1859

learning of this work, returned to his paper of 1843 and republished it with another essay in 1855, entitled 'Puerperal Fever is a Private Pestilence.' He reiterated all of his views without a single change and the evidence was so strong in his favor, combined with the careful work of Semmelweis, that all opposition stopped. Puerperal fever, once the great dread of every pregnant woman, was lessened to a remarkable degree. To Holmes should go the credit for suggesting the contagiousness of the disease, to Semmelweis the honor of first having proved the points suggested by Holmes by actual experiment. Semmelweis's investigations also showed that the disease was an actual blood-poisoning or septicæmia, a point not recognized by Holmes.

Holmes later became the Professor of Anatomy at the Harvard Medical School and did much to enliven a dry subject. He made no discoveries of importance, but he wrote many clever medical poems and his 'Medical Essays' (1883) was the most important American book dealing with medical history in its day.

The first forty-odd years of the nineteenth century are characterized, therefore, by a number of unusual advances in medicine in Massachusetts. First came the activities of Benjamin Waterhouse, who inaugurated vaccination with cowpox in this country. Then there were the struggles of the Medical School, beginning with the friction between Waterhouse and John Warren and continued all through the years. Because of the private school institutions which

sprang up in opposition to it, the affairs of the School did not settle down definitely at any time during the entire period. These, too, are the years of the development of the hospitals, especially the Massachusetts General Hospital, opened in 1821, the Massachusetts Eye and Ear Infirmary in 1824, and the Lying-In Hospital in 1832.

The outstanding men of the period were Waterhouse, James Jackson, John Collins Warren, Jacob Bigelow, and Oliver Wendell Holmes. Jackson was an early contributor to medical literature, and his paper on 'Alcoholic Neuritis' in 1822 was one of the first to emanate from the Massachusetts General Hospital. Jacob Bigelow's paper on 'Self-Limited Diseases' in 1835 was of great general importance, but to Oliver Wendell Holmes must go the credit for making the greatest advance in medicine during the period with his paper on puerperal sepsis in 1843. From the years 1830 to 1840 we have noticed the influence of Louis and the French school on our younger medical men seeking a foreign education. Quickly following this period, we shall see the effects of the discovery of ether anæsthesia upon Massachusetts medicine.

CHAPTER VI

THE DISCOVERY OF ETHER ANÆSTHESIA

1846

THE 'Death of Pain,' as S. Weir Mitchell so aptly described the discovery of ether anæsthesia, is not only the greatest contribution Massachusetts has made to medicine, but, indeed, the most important advance in medicine ever made in America. To those who lived through the pre-anæsthetic days no words were adequate to express the distress and struggles of patients undergoing an operation. Surgery was a matter of speed, and surgeons before 1846 prided themselves on the quickness of their manipulations; they were often 'pitted one against the other like runners on time.' He was the best surgeon, both for patient and onlooker, who broke the three-minutes record in an amputation. But, as Clifford Allbutt, the distinguished English medical-historian, has said, 'with anæsthetics ended slapdash surgery; anæsthesia gave time for the theories of Pasteur and Lister to be adopted in practice.' In addition, it gave to the obstetrician the same advantages as the surgeon and enabled the lying-in woman to endure the pangs of labor with greater ease and security. It made possible, also, surgical exploration of the human to an extent unknown by earlier surgeons and, in animals, removed the sufferings of vivisection. No other discovery in medicine, with the exception of the work of Pasteur and Lister which came later, has been so

beneficial to the human race; anæsthesia is, again to quote Mitchell, the 'highest mercy brought by man to man.'

There were five men who definitely contributed to the discovery of ether anæsthesia. The first was Gardner Quincy Colton (1814–1898), who was born in Georgia, Vermont, of a poverty-stricken family. Owing to eye trouble, Colton received scanty education, but he learned to be a maker of cane-seated chairs and carried on this occupation for some years. In 1842 he studied medicine under Willard Parker, of New York, but did not take a degree. Two years later he had learned of the exhilarating effects of nitrous oxide inhalation and gave a public demonstration in New York; he extended these demonstrations to other cities, including Hartford, Connecticut, in 1844, where the performance excited the interest of a dentist, Horace Wells, who later was one of the claimants in the anæsthesia controversy. Wells gave Colton the credit for first suggesting the practical use of nitrous oxide in extracting teeth. His relations to ether anæsthesia, therefore, came through his influence on Wells, who played a much larger part in the discovery.

Horace Wells (1815–1848), born in Hartford, Vermont, obtained a good education in New England church schools. He went to Boston, in 1834, to study dentistry, and two years later opened an office in Hartford, Connecticut. During 1841 and 1842, another young dentist, William T. G. Morton, studied dentistry under Wells and they opened a joint office in Boston. Their partnership, however,

was dissolved in 1843 and Wells returned to Hartford. The next year Wells became interested in nitrous oxide anæsthesia as described by Colton. The day after a lecture, in 1844, Colton was invited to Wells's office to demonstrate the effects of 'laughing gas,' as nitrous oxide was called. While under its influence, a fellow dentist extracted one of Wells's teeth without causing pain. Colton taught Wells how to manufacture and administer the gas. Although Wells was familiar with the similar effects of ether, which apparently he had used in extracting teeth, he discarded ether because of its unpleasant odor. Before doing so, however, he wrote to Valentine Mott, a prominent New York surgeon, suggesting that ether might be preferable to nitrous oxide in long major surgical operations.

Early in 1845, Wells came to Boston with the idea of bringing his discovery of the use of nitrous oxide before the medical profession. He visited Morton and succeeded in obtaining an opportunity to speak before one of the medical classes of John Collins Warren at the Harvard Medical School. While the patient was being anæsthetized with gas, Wells attempted to extract a tooth, apparently before the anæsthesia was complete; the man shrieked with pain, the students jeered, and Wells was humiliated. He returned to Hartford deeply discouraged, and there are only two or three authentic instances on record of his having used the gas again.

Wells claimed the discovery of anæsthesia nearly two months after Morton had demonstrated the use of ether, as will be seen later, and nearly three weeks

after Morton's results were published by Henry J. Bigelow. In 1847, Wells went to Paris, where he published a letter stating his claims to priority. After ether had become recognized, Wells made two or three attempts to prove nitrous oxide a better anæsthetic than ether. His experiments, repeated in a New York hospital, were a failure. He induced several physicians, however, to carry out major surgical operations with 'laughing gas,' and Henry J. Bigelow finally yielded to the claim of Wells's supporters and operated under nitrous oxide at the Massachusetts General Hospital in 1848. The state of prolonged anæsthesia produced by the gas nearly proved fatal, and Bigelow quickly recognized that, for protracted operations, nitrous oxide was inferior to ether. Meanwhile, Wells, discouraged and disheartened, took his own life in 1848 at the early age of thirty-three. Wells's character and his contribution to the discovery of ether anæsthesia have been summarized by Hodges:[1] 'Volatile, ingenious, unsurpassed as an experimenter, Wells was, like scores of others in the field of anæsthesia, unsuccessful in establishing anything of value. So far as his labors went, he left scientific knowledge as well as its application to art just about where Davy left it a century before. Nevertheless he helped to keep the subject alive and unintentionally planted in the mind of his ambitious partner [Morton] the seed which finally yielded fruit.'

Two other names, besides that of Morton, appear

[1] Hodges, R. M.: *A Narrative of Events Connected with the Introduction of Sulphuric Ether into Surgical Use.* Boston, 1891.

in the history of the discovery of ether: one a chemist and geologist, Charles T. Jackson (1805–1880), and the other a physician, Crawford W. Long (1815–1878). Jackson, born in Plymouth, Massachusetts, was prepared for the study of medicine by James Jackson and Walter Channing. He was graduated by the Harvard Medical School in 1829. Besides his interest in medicine, even while a student, he studied mineralogy, and he twice visited Nova Scotia during that period to collect geological specimens. In 1829, Jackson went to Europe, where he studied medicine, as well as geology and mineralogy, in France. He travelled extensively in France, Switzerland, and other countries, made acquaintance with the leading medical men of the time and, during an epidemic of cholera, performed numerous autopsies, the results of which he published in 1832. When he returned to Boston he practised for a few years but, finding that his services were more in demand as a chemist and mineralogist than as a doctor, he gave up the practice of medicine, at least in part, and established a laboratory, where he did considerable teaching in addition to his scientific work. He also made a geological survey of Maine and Massachusetts in 1836, and later undertook a similar survey of Rhode Island and New Hampshire.

In 1846, however, he became involved in the bitter controversy concerning the introduction of surgical anæsthesia. Jackson claimed to be the virtual discoverer and said that others had robbed him of his idea. His claims were based, briefly, on the facts that, as early as 1834, he had observed the anæsthetic

effects of an alcoholic solution of chloroform when applied to a nerve; by 1837 he had learned something of nitrous oxide; in 1841 or 1842 he had accidentally broken a large container of chlorine gas, nearly suffocating as a consequence, and, through inhalation of ether, the pain and irritation caused by the accident were relieved. The anæsthetic effects of ether were thus disclosed to him and he carried on further experiments, on one occasion completely etherizing himself and remaining unconscious fifteen minutes. On September 30, 1846, he suggested to Morton that ether could be used for extracting teeth and told Morton how to administer it, but he took no further interest in the subsequent rapid development which followed Morton's use of ether and assumed no responsibility until December, when he addressed two letters to the French Academy of Sciences in which he announced himself the discoverer of surgical anæsthesia, without mentioning Morton's name. In March, 1847, he made a similar announcement to the American Academy of Arts and Sciences, Boston. Jackson undoubtedly knew that inhalation of ether would produce unconsciousness, for this was common knowledge at that time. He gave Morton the suggestion and supplied him with the ether that was used during the first operation, but he took no part in demonstrating the surgical uses of ether, and had Morton's experiment proved fatal to the patient, Jackson would undoubtedly have been the first to condemn him. Jackson's later years were marked by perpetual controversy, and finally, in 1873, his mind gave way, but he did not die until 1880. Jackson was

an erratic and versatile genius with an extraordinary capacity for hard work. 'He had the inventive faculty; the habit of incessant investigation; the faculty of getting tangible, fruitful results, the ability to suggest successful experiments to others.' One of the 'others,' fortunately, was W. T. G. Morton.

Crawford W. Long (1815–1878), another claimant, came from a cultivated Southern family. He was born in Danielsville, Georgia, and was graduated by Franklin College (later the University of Georgia) in 1835, the second in his class. He received his medical degree at the University of Pennsylvania in 1839, after which he spent a year and a half in New York, where he gained the reputation of being a skilful surgeon. Returning to Georgia, Long began practice in the rather isolated village of Jefferson. In January, 1842, after the more or less spectacular effects of nitrous oxide had become known in Georgia, several of Long's friends induced him to permit them to have a 'nitrous oxide frolic' in his rooms. No nitrous oxide was available, so sulphuric ether was used. The young men became hilarious after inhaling the volatile gas and many received more or less severe bruises; Long made the shrewd observation that the bruises were unaccompanied by pain. He decided to test ether in his surgical practice.

On March 30, 1842, he administered ether to a patient and removed a small cystic tumor from the back of the patient's neck; the man later testified that he experienced no pain. On June 6, 1842, a similar tumor was removed from the same patient,

and on July 3, 1842, the toe of another patient was amputated. Eight operations in all were performed by Long under ether anæsthesia before September, 1846, all of them successful. His experiences with ether, however, were not published until December, 1849, and then only because of the controversy that had arisen over Morton's claims. Long said later: 'I was anxious before making my publication to try ether on a sufficient number of cases to fully satisfy my mind that anæsthesia was produced by the ether and was not the effect of the imagination or owing to any peculiar insusceptibility to pain in the person experimented upon.... I determined to wait... and see whether any surgeon would present a claim to having used ether by inhalation in surgical operations prior to the time it was used by me.' He, therefore, was deprived of the larger honor, which would have been his due, had he not delayed publication of his experiments with ether until several years after the universal acceptance of surgical anæsthesia. As William H. Welch has written, 'We need not withhold from Long the credit of independent and prior experiment and discovery, but we cannot assign to him any influence upon the historical development of our knowledge of surgical anæsthesia or any share in its introduction to the world at large.' No physician or surgeon ever used ether because Long had used it, 'nor did mankind learn from him that anæsthetic inhalation for surgical purposes was possible.' Long was ever modest in urging his claims and quite different from the other claimants. In 1850 he removed to Athens, Georgia, where he acquired a large surgical

practice. He died in that city after a long and useful career.

William T. G. Morton (1819–1868), who should receive the credit for introducing surgical anæsthesia to the world, was born in Charlton, Massachusetts, the son of a farmer. His ancestors had migrated from Scotland early in the seventeenth century. Morton received a common-school education, and at the age of seventeen went to Boston, where he worked as a clerk; in 1840 he went to Baltimore to study dentistry, and two years later he settled in Farmington, Connecticut, where he acquired a moderate dental practice. During the winter of 1842–43, Horace Wells and Morton practised dentistry together in Boston, but the partnership was dissolved the next spring. In 1844, Morton, conscious of his inadequate medical training, matriculated at Harvard Medical School, but, having been married the same year, he was compelled, for financial reasons, to do dental work rather than continue his medical education. He lived at the time with Charles T. Jackson, and in July, 1844, on Jackson's recommendation, Morton used ether as a local anæsthetic during the filling of a tooth. Morton had found that few patients would submit to the painful proceeding of removing the roots of old teeth, which was necessary in order to fit artificial teeth effectively. He tried various intoxicants, opium, and even mesmerism and other questionable procedures, to deaden pain, but none was effective. After noting Jackson's demonstration of the effects of sulphuric ether before his chemical classes, Morton tried ether upon himself,

and during July and August, 1846, anæsthetized a goldfish, a hen, and his pet spaniel. All of these animals recovered without obvious impairment and Morton decided to use ether upon human beings.

On September 30, 1846, Morton had a conference with Jackson, during which, for some unaccountable reason, he professed complete ignorance of the effects of ether inhalation. That afternoon, however, a patient came to Morton in agony with a toothache. Morton let him breathe the fumes of the ether which he had borrowed that morning from Jackson, and in less than five minutes the tooth was painlessly extracted. Public notice of this incident appeared in the 'Boston Daily Journal,' October 1, 1846. Other successful extractions followed.

The announcement attracted the attention of Henry J. Bigelow, a young surgeon of Boston and the son of Jacob Bigelow, who called upon Morton to obtain further details. Through Bigelow, the news reached the ears of John Collins Warren, the outstanding surgeon of his day, who made arrangements with Morton to try the new discovery at the Massachusetts General Hospital on October 16, 1846. A second operation was done on the following day under Morton's supervision by George Hayward, with equal success. During the next two weeks a disagreement arose as to the advisability of continuing the procedure, since Morton was not a qualified physician and refused to tell the composition of the anæsthetic agent. The difficulties were finally overcome and the discovery was first publicly announced by Henry J. Bigelow.

Wm. S. Newton

Immediately after the two successful operations, Morton sought to secure profit from his discovery and applied for a patent to protect his rights. He did not reveal that the anæsthetic agent was sulphuric ether, but designated it by the mysterious name of *letheon*. October 27, 1846, he applied to the Government for a letter patent, which was issued November 12 for a period of fourteen years. On November 26, Morton stated publicly that he was prepared to grant licenses for the use of his apparatus and discovery, but on Bigelow's advice agreed to repay the fee should the United States Government adopt his invention. On November 28, he stated that certain charitable hospitals could use *letheon* free of charge. Within the next few years bills were introduced into Congress to give Morton financial award, but, owing to the activities of the supporters of Jackson, Wells, and Long, the appropriations were never carried. The deliberations of committees were drawn out for nearly two decades, but when the Civil War came the cause was lost in a mass of unfinished business.

The last twenty years of Morton's life were spent in a perpetual turmoil of bitter controversy and litigation as a result of which he was reduced to dire poverty. His wife was eventually left penniless with a son to support. He died suddenly of apoplexy in New York. The seizure was thought to have been induced by reading a publication just then issued in behalf of Jackson.

The actual operation took place in the dome of the original Bulfinch Building at the Massachusetts General Hospital. It was performed by John C.

Warren, then sixty-eight years of age, in the presence of a number of his colleagues and students from the Harvard Medical School. Gathered around the table were, in addition to Warren, his son J. Mason Warren, S. D. Townsend, Samuel Parkman, Henry J. Bigelow, and George Hayward. The two older men, J. C. Warren and George Hayward, were the most distinguished surgeons of their day. There was an air of tenseness about the operating-room, for Warren had explained to the students 'that a test of some preparation was to be made for which the astonishing claim had been made that it would render the person operated upon free from pain.' Morton, the dentist, was late, and when he appeared, Warren said to him, 'Well, Sir, your patient is ready.' In a few minutes the patient was under the ether and Morton, turning to Warren, said, '*Your* patient is ready, sir.' The patient, one Gilbert Abbott, had a small congenital tumor on the left side of his neck. The operation was successful and the patient declared afterwards that he suffered practically no pain. Warren turned to those present and said, 'Gentlemen, this is no humbug.' Thus the use of ether as a general anæsthetic was publicly demonstrated. The first definite report in writing appears in an article by Henry Jacob Bigelow published in the 'Boston Medical and Surgical Journal' for November 18, 1846. The paper had been read in abstract first before the American Academy of Arts and Sciences, November 3, and subsequently before the Boston Society of Medical Improvement, November 9, 1846.

'The discovery of surgical anæsthesia was without

the incisive features of a scientific demonstration. Long, Wells, and Jackson all contributed, Jackson more directly than Long or Wells, yet Morton acted independently and conducted experiments with ether on his own initiative. He, moreover, took the entire responsibility for the outcome of his first public demonstrations upon human beings, and in so doing he, before any one else, convinced the world of the value of surgical anæsthesia. For this alone, one may allow him the credit of the discovery, and this indeed is the opinion of those of his contemporaries most competent to judge. The demonstration was in addition a triumph of the experimental method which makes his position even more secure. There were regrettable circumstances in Morton's conduct, but these, though they may lessen, cannot rob him of his honor.' [1]

[1] Fulton, J. F.: 'William T. G. Morton,' in *Dictionary of American Biography* (in press).

CHAPTER VII

MODERN DEVELOPMENTS IN SURGERY AND MEDICINE

1847–1930

THE use of ether as an anæsthetic spread rapidly, and by January of 1847, it was employed by Sir James T. Simpson, of Edinburgh, although he soon substituted chloroform. In Boston, Walter Channing, the Professor of Obstetrics in the Harvard Medical School, began using ether at once and, by 1848, was able to report on over five hundred cases. Channing was one of the founders of the Boston Lying-In Hospital in 1832, Dean of the Harvard Medical School, and co-editor of the 'Boston Medical and Surgical Journal.' His treatise on etherization in childbirth was a remarkable book and served to bring the subject fully before the whole civilized world.

In 1849 there occurred in Boston an incident that stirred the medical profession as well as the whole populace. George Parkman, a well-known physician of Boston, who had donated the land on North Grove Street for the medical school building erected in 1846, was murdered by John W. Webster, the Professor of Chemistry at the Harvard Medical School. There had been a serious altercation between the two men in regard to financial affairs, and Webster later confessed to the atrocious murder. He was hanged August 30, 1850. The prominence of both men, the

fact that Parkman had disappeared and the discovery of his dismembered body was not made for a number of days, and the complete confession of Webster made the murder a most unusual one.

The next ten years seem to have passed rather quietly in Boston. There was some interest shown in the newly formed American Medical Association, founded in New York in 1846. Holmes, Bowditch, and John C. Warren were early members and Warren was the third president. War clouds were again gathering and the physicians of Massachusetts were preparing to take an active, although not a very conspicuous, part in the events of 1861–1865. No single physician stood out prominently as had Joseph Warren and his brother John in the American Revolution. The list of names is a long one; mention should be made of Zabdiel Boylston Adams, graduated by the Harvard Medical School in 1853, who served through the peninsular campaign, the siege of Yorktown, and many extensive engagements. He was wounded in 1864 and experienced the horrors of Lynchburg and Libby prisons. Re-enlisting in 1865, he received his fourth wound. Few physicians saw such extensive service and none carried himself with greater fortitude.

Another physician who served throughout the war was Samuel A. Green, a graduate of the Harvard Medical School in 1854. He was at Bull Run, Roanoke Island, with the North and South Carolina expeditions, and later instituted smallpox hospitals at Augustine and Jacksonville, Florida.

John Homans served in both the Navy and the

Army, and finally was given the position as acting medical director of the Army of the Shenandoah.

After the Civil War, Boston and Massachusetts physicians again settled down. Good work was being done in the hospitals by competent men but surgery and medicine needed new stimulation. This was soon to come from Europe through various channels: Darwin's 'Origin of Species' (1859); Huxley's 'Man's Place in Nature' (1863); His's invention of the microtome in 1866; the masters of physiology, Helmholtz, Claude Bernard, and Carl Ludwig; Virchow's 'Cellular-Pathologie' (1858); Pasteur's work on fermentation (1857); Koch's first important work on the life-history of the anthrax bacillus (1876) and the development of bacteriology (1878); Lister's papers on antisepsis (1867) and the work of the surgeons, especially Billroth, Mikulicz, James Paget, James Y. Simpson, Credé, Hicks, and von Graefe.

The German influence was strongly felt and, by 1870, the best of the young medical students were turning to Germany, as the students of 1830 to 1840 had turned to France. Charles S. Minot went to Leipsic to study with the famous physiologist, Carl Ludwig, as had his teacher, Henry P. Bowditch. Returning to Boston, Minot began his long association with the Harvard Medical School, developing histology and embryology. His work culminated in an important publication, 'Human Embryology' (1892). The same influences led to the development of the first physiological laboratory in the United States at the Harvard Medical School by Henry P. Bowditch. His experiments, already mentioned in the

previous chapter, are, perhaps, the most important contribution of the time from Massachusetts.

The surgical field in Boston was dominated up to 1880 by the striking personality of Henry Jacob Bigelow. His outstanding contributions were 'The Mechanism of Dislocations and Fractures of the Hip' (1869) and the introduction of the lithotrite for rapid evacuation of vesical calculus (1878). Bigelow, a little slow to recognize the value of Lister's work to surgery, was anticipated by Henry O. Marcy, a student of Lister, who did many abdominal operations in his private hospital, under antisepsis, before the procedure was adopted by the general hospitals. Marcy also introduced antiseptic absorbable ligatures and improved the technique of hernia operations.

For the last fifty years Massachusetts surgery has been of the highest type, although few individuals stand out from a large group of first-class men. One exception may be made in the earlier period and one in more recent times. The work of Reginald Heber Fitz was both striking and original; it deserves a high place in the annals of medicine in Massachusetts. Fitz (1843–1913) was graduated by the Harvard Medical School in 1868, spent two years abroad, especially in Vienna, then the centre of medical education in Europe, and in Berlin, with Virchow. Returning home in 1870, he was one of the first to bring to Boston the new cellular pathology of his Berlin master. His interests were recognized and he became associated with the Harvard Medical School in pathology the same year. Fitz developed the department from 1870 to 1892; his lectures were

'models of clear and precise exposition, admirably delivered.' In 1887, he was made a visiting physician to the Massachusetts General Hospital. His classical paper on 'Perforating Inflammation of the Vermiform Appendix' (1886) gave, for the first time, a clear picture of the clinical course, diagnostic signs, and pathological changes of appendicitis. He advocated radical operation as the only rational means of saving life. His conclusions were based on the study of many hundreds of cases at the Massachusetts General Hospital. A few years later, Fitz described another acute abdominal disease, pancreatitis.

In the last twenty years, the foremost contributions from Massachusetts have come from the clinic of Dr. Harvey Cushing. After training in surgery at the Massachusetts General Hospital, he spent ten years at the Johns Hopkins Hospital, where he developed the first field of neurological surgery in this country. Coming to Boston in 1912, Cushing extended his observations on cerebral surgery, particularly on brain tumor, and on cultural medicine in a series of monographs and papers, including, 'The Pituitary Body and its Disorders' (1912), 'Tumors of the Nervus Acusticus' (1917), 'A Classification of the Gliomata' (1925), 'The Life of Sir William Osler' (1925), 'Studies in Intracranial Physiology and Surgery' (1926), 'Tumors Arising from the Blood-vessels of the Brain' (1928), and 'Consecratio Medici, and other papers' (1928).

Between the time of Fitz and Cushing, a large group of well-trained and skilful surgeons have practised in Massachusetts; to mention all of them

will be, perhaps, the duty of a future historian. The following names can well, however, be noted now: David Williams Cheever (1831–1915), one of the founders of the Boston City Hospital in 1864 and Professor of Surgery at the Harvard Medical School after Henry J. Bigelow in 1882; John Homans (1836–1903), surgeon of the Civil War, a pioneer ovariotomist, performing the operation over six hundred times from 1872 to 1900, mostly at St. Margaret's Hospital, Louisburg Square, Boston; Samuel Jason Mixter (1855–1926), who invented many surgical instruments and was a skilful surgeon; James Gregory Mumford (1863–1914), an eminent writer as well as pioneer in medical reform, and Maurice Howe Richardson (1851–1912), who wrote extensively on appendicitis and other abdominal diseases and who was a close associate of Fitz.

The need for a medical library seems to have become acute in 1874. Henry I. Bowditch called a meeting at his office the latter part of that year, and in 1875 the Boston Medical Library was definitely established, with Oliver Wendell Holmes as president. The rooms first occupied were at No. 5 Hamilton Place. These were soon outgrown and in 1878 the library moved to 19 Boylston Place, and in 1901 to its present building.

The greatest reform in medical education in this country took place about 1870 at the Harvard Medical School. It was due to the instigation of the recently elected president of Harvard University, Charles W. Eliot. He saw at once the defects of medical education at the time and in his report of

that year stated: 'The whole system of medical education in this country needs thorough reform.' He was particularly insistent that the course should cover three years, be progressive in character, and have both winter and summer sessions. There was considerable opposition to his views by the medical faculty, the leader being Henry J. Bigelow, who took the conservative point of view 'that physicians are born, not trained, and that the same applied more strongly to surgeons.' Oliver Wendell Holmes, in a letter written in 1870, gives an amusing description of the new President of Harvard University dealing with the older members of the staid and conservative medical faculty:

I cannot help being amused at some of the scenes we have in our medical faculty, — this cool, grave young man proposing in the calmest way to turn everything topsy turvy; taking the reins into his hands and driving as if he were the first man that ever sat on the box. 'How is it, I should like to ask,' said one of our number the other day, 'that this Faculty has gone on for eighty years managing its own affairs and doing it well, — for the Medical School is the most flourishing department connected with the College, — how is it that we have been going on so well in the same orderly path for eighty years, and now, within *three or four months*, it is proposed to change all our modes of carrying on the School? It seems very extraordinary, and I should like to know how it happens.'

'I can answer Dr. ——'s question very easily,' said the bland, grave young man: 'There is a new President.'

The tranquil assurance of this answer had an effect such as I hardly ever knew produced by the most eloquent sentences I ever heard uttered. Eliot has a deep,

almost melancholy-sounding voice, with a little of that character that people's voices have when there is somebody lying dead in the house, but a placid smile on his face that looks as if it might mean a deal of determination, perhaps of obstinacy. I have great hopes of his energy and devotion to his business, which he studies as I suppose no President ever did before; but I think the Corporation and Overseers will have to hold him in a little, or he will want to do too many things at once.[1]

The School was reorganized along the line suggested by President Eliot. Teaching was taken out of the hands of individuals who had collected private fees, the course was enlarged, entrance examinations were made more rigid, and the School was put on a sound basis. In 1883 the Harvard Medical School made another move to a new building on the corner of Boylston and Exeter Streets. The course was changed to one of four years. The School remained at that location until 1907, when it moved to the present buildings.

As Boston grew, it became more of a medical centre; new hospitals were developed and new medical schools came into being. Tufts College and Boston University both added first-class medical departments to aid in the ever-increasing demand for physicians. The existing hospitals expanded rapidly and new ones were built. More rigorous requirements to practise medicine were enforced by the Massachusetts Medical Society, and new standards were attained in every field: medicine, surgery, the many specialities of medicine, sanitation, hospitalization,

[1] Harrington, T. F.: *The Harvard Medical School*, 1905, p. 1023.

tuberculosis prevention, the better care of the insane, public health, dispensary and health centres, medical inspection of school children, and general health education through newspapers, magazines, lectures, and the radio.

Some of the men who made these changes possible should receive special recognition; the group is a large one and only a partial list can be given. Among the surgeons, in addition to the men noted above, mention should be made of Arthur T. Cabot (1852–1912), a general surgeon who, also, became the leading genito-urinary surgeon in New England. His interests outside of surgery were varied and he played a definite part in the school hygiene movement in Boston and in the crusade against tuberculosis. For many years he was one of the Fellows of Harvard University.

John W. Elliot (1852–1925) was also a surgeon of note. He was especially well trained abroad and entered into the practice of surgery in Boston in 1880, tending to specialize in gynecology, a subject which he taught in the Harvard Medical School. He was a pioneer in the introduction of antisepsis into medicine, his first writings on the subject appearing in 1880. Elliot appreciated early the work of Reginald H. Fitz on appendicitis, and he was the first surgeon in this community to open the abdominal cavity to search for an inflamed appendix, almost against the advice of Fitz, who was present. He developed many new innovations in surgery, including the introduction of gauze sponges as a substitute for the old sea sponges, which it was difficult, if not impossible, to thoroughly sterilize.

Henry A. Martin (1824–1884) should be remembered on account of being the first surgeon to adopt the strong pure rubber bandage, since called the Martin bandage (1877). Another surgeon, John C. Munro (1858–1910), started the surgical clinic at the Carney Hospital, instituted in 1903, the first continuous surgical clinic to be established in New England. Edward H. Nichols (1864–1922) developed the subject of surgical pathology at the Harvard Medical School and the Boston City Hospital to a point not surpassed by any one before his time. He made special investigation into diseases of the bones, and his pathological specimens, now in the Warren Museum, are noteworthy.

Charles B. Porter (1840–1909) was long a member of the staff of the Massachusetts General Hospital. His surgical career began before the days of Listerism and extended up to the beginning of the present century. He was an outstanding teacher of his time, and did much to develop aseptic surgery in Massachusetts. Another surgeon, Ernest B. Young (1869–1923), practised gynecology and developed the gynecological service at the Boston City Hospital.

In medicine, mention should be made of John G. Blake (1837–1918), a physician long attached to the Harvard Medical School and the Boston City Hospital. He was the first visiting physician at the Boston City Hospital, appointed in 1864, and was also influential in founding the Carney Hospital, where he served as consulting physician for many years. He was one of the outstanding clinical teachers in his time.

The leading homœopathist in Boston for many years was Conrad Wesselhoeft (1834–1904). He did much to establish the Boston University School of Medicine and also lectured occasionally to the students of the Harvard Medical School on the principles of homœopathy. Edward N. Whittier (1841–1902), after a long service during the Civil War, entered the Harvard Medical School, where he was graduated in 1869. He served for some years on the staff of the Massachusetts General Hospital, and was an able teacher of clinical medicine. Charles F. Withington (1852–1917) also had a distinguished career in clinical medicine in Boston. For many years he taught at the Harvard Medical School and in the Boston City Hospital. He was closely associated with the Massachusetts Medical Society and served on many committees. Withington was on the editorial staff of the 'Boston Medical and Surgical Journal.'

Massachusetts has contributed many men of importance to psychiatry, among whom should be mentioned Walter Channing (1849–1921), the grandson of Walter Channing (1786–1876), the obstetrician, who was graduated by the Harvard Medical School in 1872. He opened a sanatorium in Brookline for the care of patients with mental diseases in 1879, and served as an expert on insanity in court in many important cases. Channing did much to improve the status of the State institutions for the care of the insane, especially the Boston State Hospital. Edward Cowles (1837–1919), who was responsible for the growth and development of the McLean Hospital

for mental diseases, was the outstanding psychiatrist of his time; his hospital became the foremost semi-private institution in the country. Walter E. Fernald (1859–1924) spent his life in the study and training of the feebleminded. In 1887 he was appointed superintendent of the Massachusetts School for the Feebleminded in South Boston, a school which was removed to Waverley, Massachusetts, in 1893. Here Fernald built up an organization which brought fame to him and to his school from the entire country and Europe. Herbert J. Hall (1870–1923) was a pioneer in the development of occupational therapy, especially in the treatment of patients suffering from psychoneurosis. He built a sanatorium in Marblehead, Massachusetts, in 1912, where his ideas could be put in practice, and wrote a number of important books on the subject. August Hoch (1868–1919) was one of the originators of modern scientific psychiatry in this country. Closely associated, for many years, with Cowles at the McLean Hospital, he made many valuable studies of the microscopic pathology of diseases of the central nervous system, as well as distinct contributions to clinical psychiatry.

Neurology in Massachusetts owes its beginning to James Jackson Putnam (1846–1918), who began teaching the subject at the Harvard Medical School in 1872, at the same time establishing a neurological clinic at the Massachusetts General Hospital. He was a charter member of the American Neurological Association, founded in 1874. Elmer E. Southard (1876–1920) made brilliant researches into the pathology of the nervous system, and was the first director

of the Boston Psychopathic Hospital, established in 1912. Also interested in social service, he was a pioneer in the training of social workers for psychiatric work. His writings were numerous, and his death at the age of forty-four was a great loss to neuropsychiatry.

In psychology, William James (1842–1910), a graduate of the Harvard Medical School in 1869, was a brilliant leader; he was followed by an equally outstanding scholar, Hugo Munsterberg (1863–1916).

Clarence J. Blake (1843–1919) did much to establish otology in Massachusetts and was a teacher at the Harvard Medical School from 1870 to 1913. Hasket Derby (1835–1914) practised ophthalmology in Boston. After an extensive training in Europe, he was one of the first men in this country to devote his practice entirely to ophthalmology (1862). Besides serving at the Massachusetts Eye and Ear Infirmary, he established the eye clinic at the Carney Hospital. Another ophthalmologist was Benjamin J. Jeffries (1833–1915), who should be especially remembered for his work on color blindness. He was on the staff of the Massachusetts Eye and Ear Infirmary for over thirty-five years. Oliver F. Wadsworth (1838–1911), also, did much to develop the specialty of ophthalmology in Boston. He was a pioneer in the use of the ophthalmoscope. Wadsworth was active in promoting the interests of the Boston Medical Library in 1875, in association with James R. Chadwick. Charles H. Williams (1850–1918) also did considerable work in color blindness and he was a pioneer in the use of the X-ray in relation to diseases of the eye.

In laryngology, Samuel W. Langmaid (1837–1915) returned to Boston after service in the Civil War. He was on the staff of the Carney Hospital as well as the Children's Hospital until 1881, when he began his work in developing the throat clinic at the Massachusetts General Hospital. He was an early member of the American Laryngological Association and did much to increase our knowledge of his specialty. A man with somewhat similar tendencies was George A. Leland (1850–1924). He developed an otology clinic at the Boston Dispensary and later, combined with laryngology, a department at the Boston City Hospital.

James C. White (1833–1916) began practice in Boston in 1857, and in 1860 started his work in dermatology. Five years later he assumed the position of dermatologist to the Massachusetts General Hospital, being the only member of the department. For thirty-three years he practised dermatology and became professor of that subject when a chair was established at the Harvard Medical School in 1871, the first in this country.

Two names stand out prominently in orthopedic surgery: Edward H. Bradford (1848–1926) and Robert W. Lovett (1859–1924). Bradford studied under Buckminster Brown, a practitioner of orthopedics, and finally succeeded him as visiting physician to the orthopedic department of the House of the Good Samaritan, the only hospital in the city at that time to have such a service. Later Bradford established departments at the Carney Hospital and at the Boston Dispensary, and in 1880 at the Boston City

Hospital. About the same time, he began teaching in the Harvard Medical School. He founded the Industrial School for Crippled and Deformed Children, the first of its kind in this country, and developed many innovations in the treatment of orthopedic cases, including the 'Bradford frame,' by which his name is best known. In 1890 he and Robert W. Lovett brought out the first edition of their treatise on 'Orthopedic Surgery,' which became a standard textbook. Lovett reorganized orthopedic surgery at the Children's Hospital, and for many years was chairman of the Harvard Infantile Paralysis Commission.

In pediatrics, Thomas M. Rotch (1849–1914) developed the subject of infant feeding on a practical scientific basis. He began to practise in Boston in 1876 and was appointed on the staff of the Boston Dispensary as well as the Boston City Hospital. He did most of his work, however, at the Infants' Hospital and at the Children's Hospital. He was one of the founders of the American Pediatric Society. In connection with infant feeding, he established the first laboratory for the modification of milk for babies (1891).

Thomas Dwight (1843–1911), after a few years of active practice, devoted himself exclusively to anatomy. He became instructor in the subject in 1872 at the Harvard Medical School, where he taught all the rest of his life. He introduced many innovations into teaching and did much to develop the anatomical part of the Warren Museum. At one time he was editor of the 'Boston Medical and Surgical Journal.'

Harold C. Ernst (1855–1922) established a labora-

tory at the Harvard Medical School for bacteriology as early as 1885. His course of lectures given to the medical students in that year were the first on bacteriology to be given in this country, by a special teacher as part of a medical course. In pathology, William F. Whitney (1850–1921) became associated with the Massachusetts General Hospital and curator of the Warren Anatomical Museum in 1879, positions which he held all the rest of his life. As consultant in pathology during his time, he was unrivaled.

Massachusetts has always been a leader in the subject of public health and hygiene. Three men have contributed definitely to this end: Charles Harrington (1856–1908), long a teacher in the Harvard Medical School and connected with the State Board of Health; Thomas F. Harrington (1866–1919), a director of hygiene in the public schools of Boston, author of the 'History of the Harvard Medical School,' published in 1905, and Eugene R. Kelley (1882–1925), who began his work in Massachusetts in 1915 as director of the State Division of Communicable Diseases and in 1918 was appointed State Commissioner of Public Health. Kelley was a pioneer in public health in Massachusetts and under his direction the State laboratories were much enlarged, for he at once recognized the value of the Wassermann test and the use of diphtheria anti-toxin, when they were first introduced into medicine.

In hospital construction, Herbert B. Howard (1855–1923), for many years the resident physician of the Massachusetts General Hospital, supervised the building of the new Peter Bent Brigham Hospital

in 1911, and George H. M. Rowe (1841–1916), long the superintendent of the Boston City Hospital, added much to our knowledge of hospital administration.

One of the first physicians to use the X-ray was Walter J. Dodd (1869–1916), who, while working as an assistant apothecary at the Massachusetts General Hospital in 1896, undertook experiments in Roentgenology. Like many other early workers, he developed severe burns, of which he finally died.

The recent development of the Boston Medical Library is due in part to the efforts of Edwin H. Brigham (1841–1926), who was a close associate of James R. Chadwick (1844–1905), the librarian. Chadwick originally practised gynecology and was one of the founders of the American Gynecological Society in 1876; his main interest was in the formation of the Boston Medical Library in 1875. Due to his initiative, a new building was opened in 1901.

Edwin B. Harvey (1834–1913) turned his attention to constructive medical legislation and was the author of the bill for establishing the Massachusetts Board of Registration in Medicine. The bill passed in 1894, and Harvey became the secretary of the Board of Registration in 1895, holding the position until 1913. Fitch E. Oliver (1819–1892), a student of Oliver Wendell Holmes, was graduated by the Harvard Medical School in 1843. He practised in Boston for nearly fifty years and was editor of the 'Boston Medical and Surgical Journal' from 1860 to 1864, visiting physician to the Boston City Hospital, and a teacher in the Harvard Medical School. He was

deeply interested in the history of Massachusetts and wrote extensively on that subject. Charles P. Putnam (1844–1914), in addition to being a well-known practitioner in Boston, was a leader in many charitable and social organizations. Dudley A. Sargent (1849–1924) developed the subject of physical training at Harvard University from 1879 to 1919. He wrote many books on the subject, and invented much of the modern gymnasium apparatus. Daniel D. Slade (1823–1896) began practice in Boston in 1852 as a surgeon. He soon became interested, however, in veterinary surgery and became first president of the Veterinary Society. He did much to establish this subject on a scientific basis. Slade was also a zoologist, and connected for many years with the Bussey Institute in Jamaica Plain. The leading chemist and medico-legal expert of his time was Edward S. Wood (1846–1905). He taught for a number of years in the Harvard Medical School. As a medical expert he was considered without an equal, and he wrote many papers on chemistry and toxicology.

Although the above-mentioned men all made some contribution to medicine in Massachusetts, none of them can be considered as makers of medical history of more than local interest. In 1926, however, Dr. George R. Minot of Boston made a contribution to medicine of the greatest importance when he developed the subject of a special diet for patients with pernicious anemia, a disease long considered as fatal. Dr. Minot, working with Dr. William P. Murphy at the Harvard Medical School and the Peter Bent Brigham Hospital, published his first paper in the

'Journal of the American Medical Association,' August 14, 1926. In this article, the authors reported the effects of a diet, particularly rich in liver, on forty-five patients with pernicious anemia. The change in the health of these patients during this treatment was nothing short of miraculous. Dr. Minot and his colleagues continued to investigate the subject further and, with the aid of Dr. Edwin J. Cohn and others, developed an extract of liver which was efficient in the treatment of the disease. With this epoch-making contribution to medicine in Massachusetts, this summary of three hundred years can fittingly close.

THE END

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